

1926



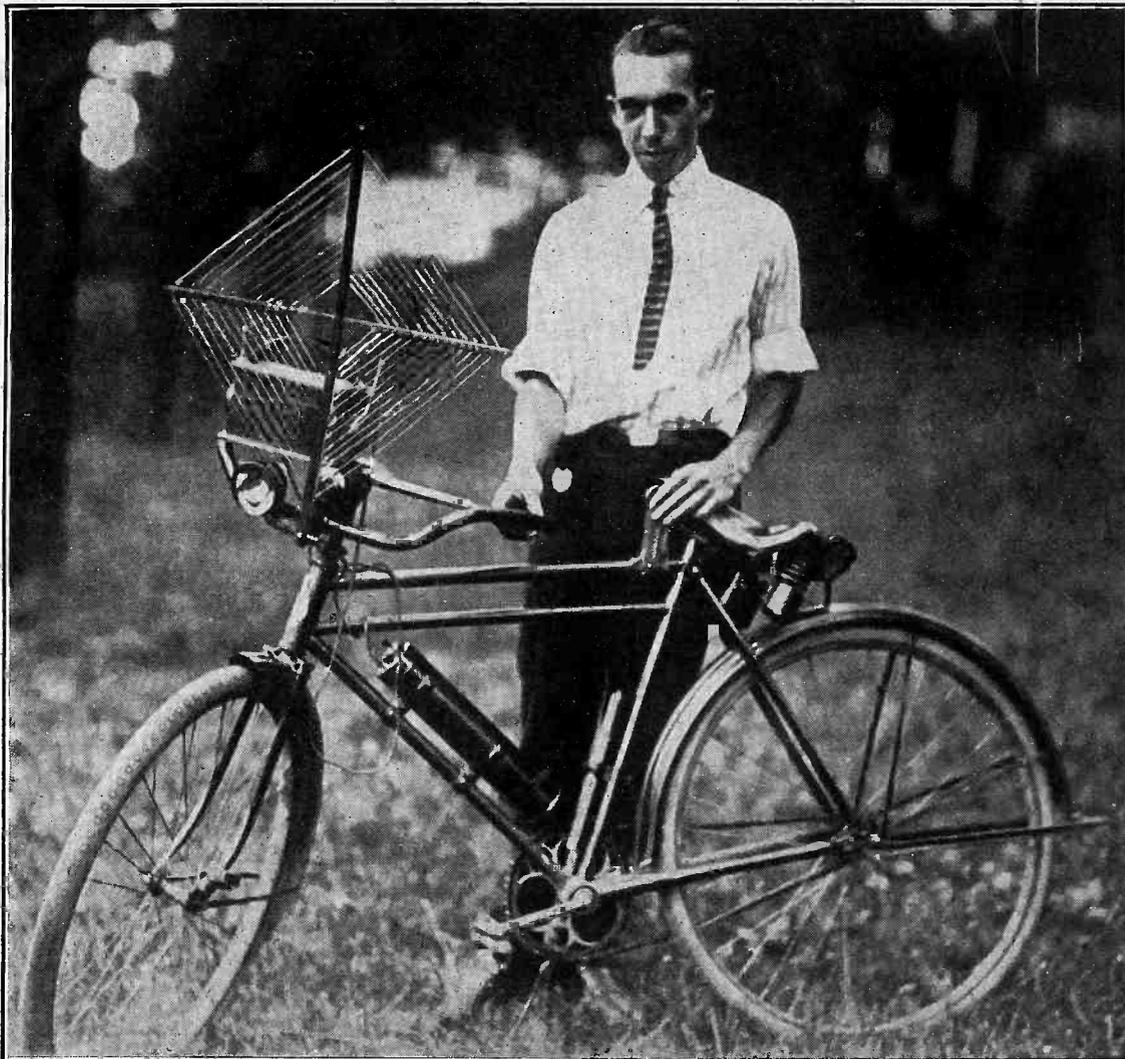
RADIO WORLD

Title Reg. U.S. Pat. Off.



Vol. 9. No. 20 ILLUSTRATED Every Week

155-228



(Herbert Photos, Inc.)

A 1-TUBE loop set gives this bicyclist reception over 100 miles. The batteries are in the tubular carrier.

Buy Safe By Guaranty

We claim that our \$40.00 BST-6 is the equal of any \$75.00 radio set. Here is how we will prove it to you.

Our Offer:—Send us your check or post office money order for \$20.00, one-half its price, try out the BST-6 in your own home for ten days, then either send us the other \$20.00, making \$40.00 in all, or return the set and we will return your \$20.00—no questions, no argument.

Send us only

\$20

and This Marvelous Set Will Be Sent You Immediately!

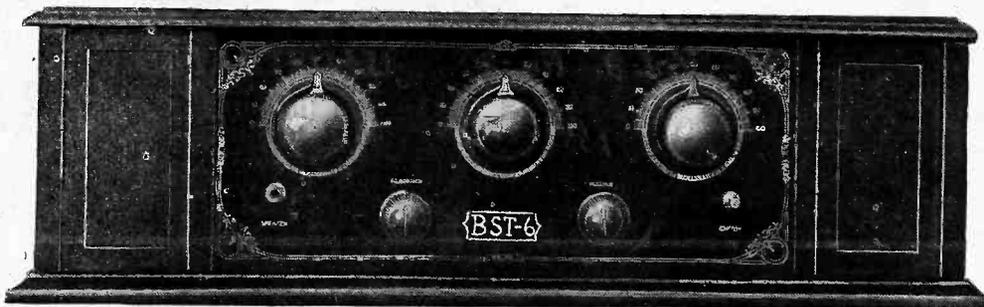
This marvelous six-tube tuned radio frequency receiver is Self-Equalized and built of low-loss materials throughout. Its clear, rich tone of astonishing volume is a revelation. The circuit consists of two stages of tuned radio frequency, tube detector and three stages of balanced audio amplification. Air cooled rheostats and universal sockets are used.

Lubree modified straight line wave variable condensers are employed, insuring separation of the low wave length stations. **PERFECT CALIBRATION — STATIONS ONCE TUNED IN CAN ALWAYS BE LOGGED AT THE SAME DIAL POINT.**

The BST-6 works best with a 75 to 100 foot aerial, 6-volt "A" storage battery, two 45-volt "B" batteries, 4½-volt "C" battery, six 201-A tubes and any good loudspeaker.

Specifications

- Bakelite Panel, Walnut Finish—With Etch-O-Gravure and Gold Decorations—
- Bakelite Sub-Base—
- Kurz-Kasch Bakelite-Walnut Pointers; Gold-filled to Match—
- Kurz-Kasch Bakelite Gold-filled Rheostat Knobs—
- Lubree Straight Line Wave Variable Condensers—
- Special Corkoid Coils; Highly Concentrated Field—
- Shore Audio Transformers—
- Caswell-Runyan Two-tone Walnut-Finished Cabinet.
- New Dubilier Grid Condenser.



The BST-6. 2 Feet 4 Inches Long. 9 Inches Inside Depth. 8¾ Inches High.

Every BST-6, since we started to sell direct from factory to consumer, has been sold on guarantee of satisfaction or money back. Ninety-nine out of a hundred have given absolute satisfaction.

We have yet to hear of any other make of radio giving such a high percentage of satisfaction. It is almost foolproof.

LOG OF BST-6

Taken on a Fifteen-Foot Aerial in One-half Hour by Al. Kraus, 996 Aldus Street, New York City.

WSBC, Chicago, Ill.....	10	WGY, Schenectady, N. Y.....	50
WBBR, Rossville, N. Y.....	16	WMAK, Lockport, N. Y.....	14
WEBH, Chicago, Ill.....	49	WMSG, New York City.....	11
WHT, Deerfield, Ill.....	55	WOC, Davenport, Ia.....	85
WCCO, St. Paul, Minn.....	61	WFAA, Dallas, Texas.....	78
WSB, Atlanta, Ga.....	66		

SELECTIVITY

I live within four blocks of WLWL, and since the opening of this station have had great difficulty in choking them off my old set. Even after employing a wave trap I could still hear WLWL around the entire dial and was told by several friends that living so near this powerful station it would be impossible to entirely cut them out with anything less than a super-het. It was a very agreeable surprise, therefore, when I installed my new BST-6, to find that while WLWL came in on 25 I could tune in WRNY on 21 and entirely cut out WLWL. *This is certainly real selectivity.*—F. S. Clark, 350 West 55th Street, New York City.

GUARANTY RADIO GOODS CO., 145 West 45th Street, New York City.

Gentlemen:—Ship me one BST-6, \$40.00 Radio Set, for which I enclose \$20.00 on account. I am to test it out for ten days in my own home and if satisfactory I will then send you the balance of \$20.00; but if not satisfactory to me, I will return the set at the end of the ten days' trial and you are to return my \$20.00 immediately on receipt of the set without question.

NAME

ADDRESS

DATE

[Entered as second-class matter, March, 1922, at the post office at New York, N. Y., under Act of March 3, 1879]

The 5-Tube Tabloid, With Panel Only 8 $\frac{1}{4}$ x5"

By A. Irving Witz

THE tabloid idea is applicable to radio receivers no less than to newspapers. For instance, who would think that a good 5-tube set could be encompassed in an 8 $\frac{1}{4}$ x5" panel and be placed in a cabinet that measures 10x8 $\frac{1}{2}$ x5 $\frac{1}{4}$ "? This is accomplished quite conveniently by using flat coils in conjunction with a stage of tuned radio frequency amplification and a tube detector, the audio channel consisting of three resistance coupled stages.

Using flat coils, such as the diamond weave or spiderweb variety, these may be placed against the left and right inside walls of the cabinet itself. The one at right is the antenna coupler L1L2 in Fig. 1 and the one at left is the interstage coupler, L3L4.

Only a speaker output is provided, as there is a diminishing desire for a detector listening post. The confinement of the output to the speaker itself renders possible the teaming up of the three audio tubes and the detector tube on one rheostat, so that the other rheostat is placed in the negative filament lead of the radio frequency tube and serves as a volume control.

Pass 1 Ampere

As it is assumed that -01A type tubes are to be used throughout, the rheostat R2, which handles four tubes, should be able to carry 1 ampere safely. This most rheostats of the 20-ohm variety will do, in fact about 1 $\frac{1}{2}$ amperes is the possible load at the rated voltage.

If dry-cell tubes are to be used no special care need be taken, as to this rheostat or the other, nor need the values be changed. R1 preferably is 30 ohms, as with this resistance it serves more conveniently as a volume control.

Often the radio frequency tube may be heated at less than the rated 5 volts. Indeed, this may be necessary for oscillation control, although if this difficulty develops a slight negative bias might be applied to the grid of the first tube, by tapping the C battery that is used in the last audio tube circuit.

The use of resistance coupling in the audio channel makes for space conservation, besides tone quality. It is a stand-

ard hookup as shown, including the very important bypass condenser, C4, which should be about .00025 mfd. As for the coupling condensers—that also isolate the positive B voltage from the next grid, by the way, thus performing a double purpose—they should be of as high a capacity as is convenient.

The Coil Data

The coils are wound of No. 20 double cotton covered wire. The spiderweb variety of coil is most easily made by the constructor. This type would be wound on a spiderweb form, which usually has an outside diameter of 5 or 5 $\frac{1}{2}$ " and a so-called core, or central circle, of about 1 $\frac{1}{2}$ ". Whatever the form dimensions, use 65 feet of the wire for the secondaries, L2 and L4. The primaries have different numbers of turns. L1 consists of 10 feet, while L3 consists of 6 feet. Cut the wire first and then start winding the antenna coupler, putting on all except 12 feet of the secondary, whereupon the 10-foot primary is picked up and wound alongside of and together with the secondary until the primary is completed, when the couple of remaining feet of secondary wire are wound to completion. So far as the winding of the primary and secondary is concerned, this is done as a simultaneous action. All winding is done on the "over one, under one" principle, that is, without skipping any arm of the form.

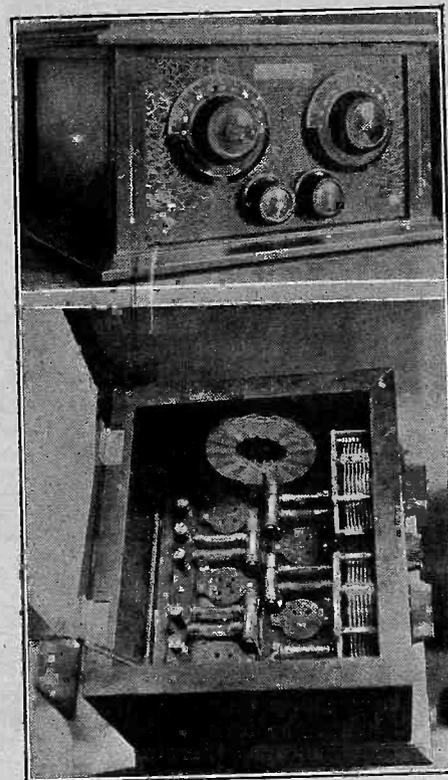
After the coil is completed the windings are stitched or otherwise bound together, for security, a little collodion being permissible.

The interstage coil is wound in the same fashion. After the coils are completed and secured the form may be removed by cutting in a circular direction, around the hub. Then the hub will fall out and the arms may be plucked out.

Panel and Subpanel

The front panel is 8 $\frac{1}{4}$ x5", and the two dials thereon are of the 3" type, to conserve space. The two rheostats are placed centrally on the lower part of the front panel.

The cabinet is 10" wide by 8 $\frac{1}{2}$ " deep x 5 $\frac{1}{4}$ " high. The base dimensions are in excess of 10x8 $\frac{1}{2}$ ", due to an ornamental ef-



(RADIO WORLD Staff Photo)

FIGS. 2 and 3

The panel view of the receiver and a view taken from the top.

fect, which may be included or omitted, as desired.

The subpanel is 5 $\frac{3}{4}$ x7 $\frac{1}{2}$ ", the larger plane being the width. On this subpanel are placed the binding posts, at rear, there being six, left to right, marked Gnd. A-, A+ Bat. B-, Speaker -, Speaker +, 135 volts +, Ant. At the posts A- and ground are connected (not shown in diagram).

The variable condensers, which are .00035 mfd. and marked C1 and C2 in Fig. 1, are mounted on the panel and the panel is placed provisionally on the cabinet, in position, to see how much room is left for the nearest sockets. These are sockets 1 and 2 in Fig. 1 and are placed side by side, with arrow at rear. It is assumed X type sockets is used and most such types have an arrow to indicate where the pin should go, in case UV tubes are used, for that is a method of safeguarding against tube blowouts. The X tubes, however, fit in only the right way.

Assuming that the front panel side of the set is nearest you, the grid leak and condenser are placed at extreme left, with the detector socket next to them, that is,

(Concluded on page 4)

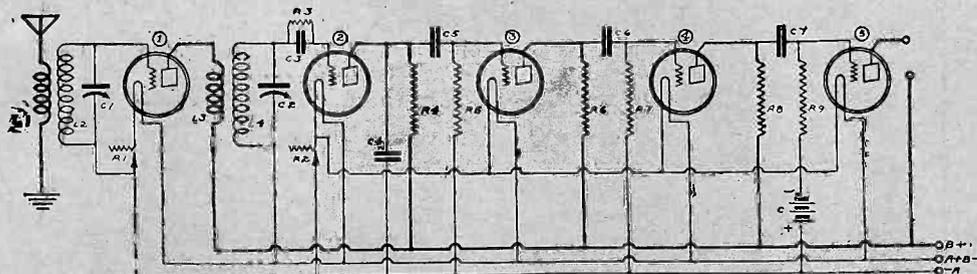


FIG. 1

Set Ills Remedied By Flexible Wire

Acrobatic Skill Required to Get Into Tight Places Where Stiff Bus Bar Is Used, Observer Finds

Engineers have recently found that more than 90% of troubles in factory-built radio receivers may be overcome by substituting flexible wiring for the stiff bus wires formerly used in radio sets.

This discovery developed out of an investigation of radio set troubles by engineers of the Crosley laboratories in which they found that by far the majority of trouble was caused by faulty accessories, aerial, and ground; but that the few instances in which the radio set itself was at fault, the defect was almost always a poorly-soldered connection.

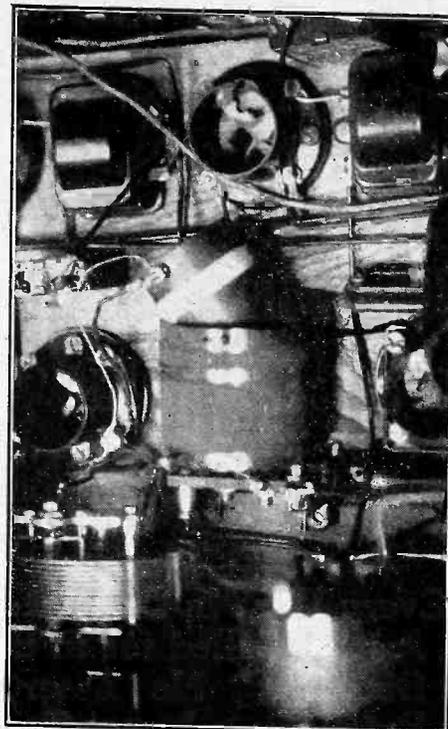
The engineers watched girls assemble sets for several days and learned that there were many wires which called for acrobatic skill in order to solder them into place. They then instructed the girls to use flexible wires, and to solder all lugs to the wires before assembling them in the set, it being possible to fit these flex-

ible wires to the set without cutting them to the exact fraction of an inch in length while attaching them to the radio set parts. No soldering was then done on the set. The number of defective joints was immediately reduced to almost zero.

This new method of radio set wiring, by doing all soldering off the set, is expected practically to eliminate troubles in factory-built radio receivers, as soldered joints have been in the past the one part of the set which could not be easily inspected and tested.

A soldered joint may appear to be good when the set is tested at the factory, and later jarring in shipment may weaken it. With soldering done under ideal conditions, however, where there are no difficult places to reach into, joints may be made sufficiently strong to withstand the roughest handling and greater efficiency may be attained.

EFFICIENCY HINT



(RADIO WORLD Staff Photo)

AN ADJUSTABLE pick-up coil, coupling the modulator and oscillator, improves Super-Heterodyne operation in many instances. Once properly set this coil may be left in that position. If the rotary coil has a knobbed shaft extending through the panel the coil may be used as a volume control.

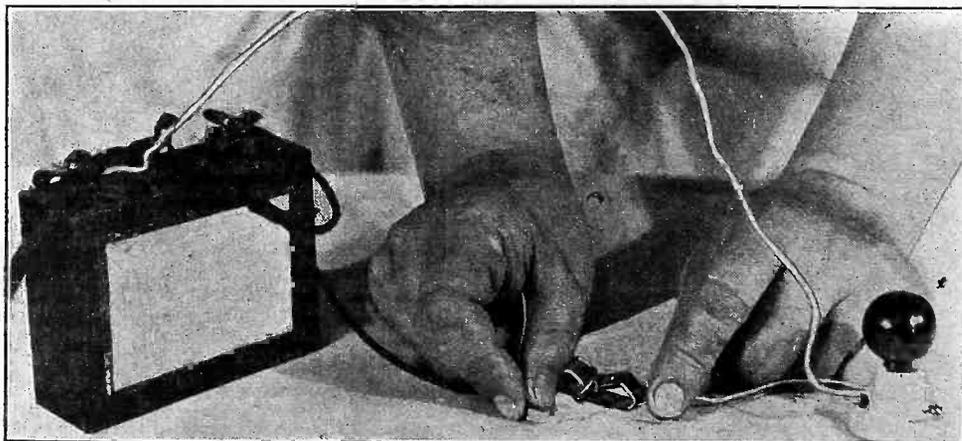
LAMP TESTS

WIRE BREAK BY FLASHES

Sometimes even the best tinsel cords (loud speaker or otherwise) will break near the tips, although the fabric insulation will remain intact. The result, however, is loose connections, and poor if any, music.

An easy means of testing these tinsel cords is shown in the photograph. Procure a small 3½-volt lamp and a C battery, using one double spring clip to hold one of the tinsel cords. The other end of the clip is connected to the C battery lead. The remaining tinsel lead is connected to the C battery as shown, and the other end of the socket also goes to the C battery. By shaking the tinsel cord the light will be caused to go on and off as the contact is made and broken, and the damaged part can soon be found. Snip off this, and carefully resolder to the tip, thus restoring the tinsel cord to usefulness.

The test is very simple and is a valuable one.



(Hayden)

BROKEN connection test by lamp and C battery

BUILDER OF SETS



(Harris & Ewing)

MISS MARY E. COLEMAN, a student of Trinity College and a resident of Washington, D. C., putting the finishing touches on one of a batch of 5-tube Neutrodyne receivers which she has been reconditioning and building during her vacation. She has built many sets.

Wire Line Connects WRNY and WMAF

WRNY, New York City, and WMAF, Dartmouth, Mass., are connected by wire line for an indefinite period. The entire WRNY program of Tuesday and Thursday of each week will be carried by special telephone line to the Massachusetts station.

Station WMAF, operated by Colonel E. H. R. Green, son of the late Hetty Green, was always known for its high calibre technical broadcasts, as Colonel Green is an enthusiastic radio engineer himself, having to his credit a great many radio inventions. WRNY is the "Radio News" station.

WRNY uses 375 meters, having moved from 258.

RESULTS

RESULTS EDITOR:

It is a pleasure to advise you that a Diamond of the Air that I constructed has far exceeded the performances expected. It certainly is a fine piece of engineering skill. Although the set was first tried during the recent heat wave, stations 1,500 miles away came pounding through as clear as a bell. Congratulations and good luck.

H. M. SAMSON, Nyack, N. Y.

* * *

RESULTS EDITOR:

I have built the Diamond of the Air and find it a wonder. With the temperature around 90° wonderful reception with little static is obtained.

HARRY GOAD,
600 W. Main St., Staunton, Va.

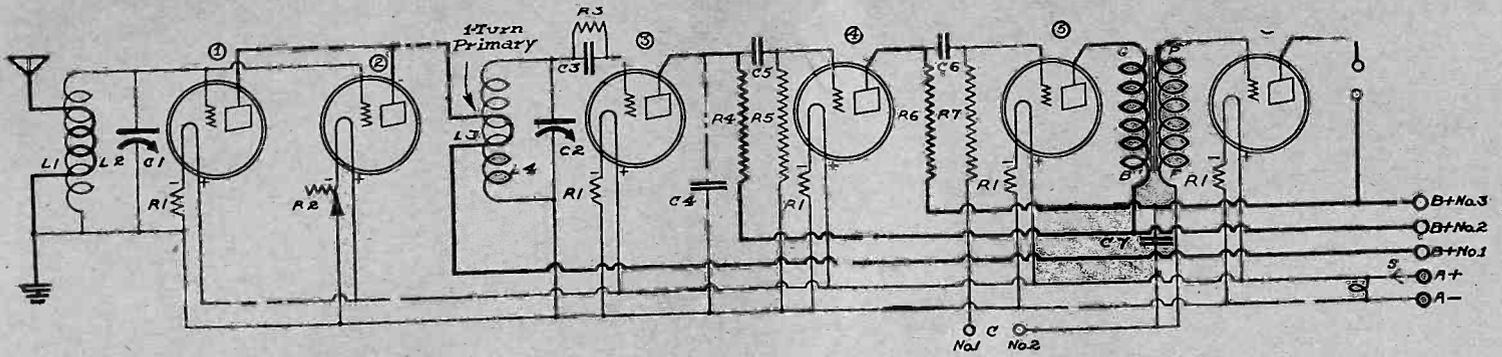
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RESULTS EDITOR:

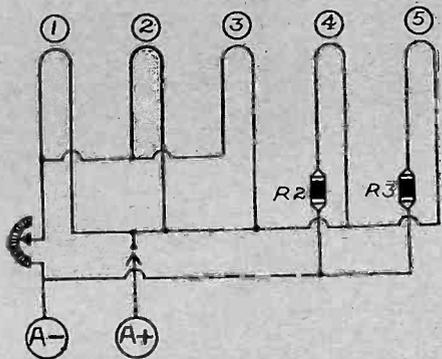
I have built the Diamond of the Air and it is indeed everything that has been claimed for it. RADIO WORLD cannot be beat in its line.

F. BEACHAM,
814 Pine St., Newton, Kans.

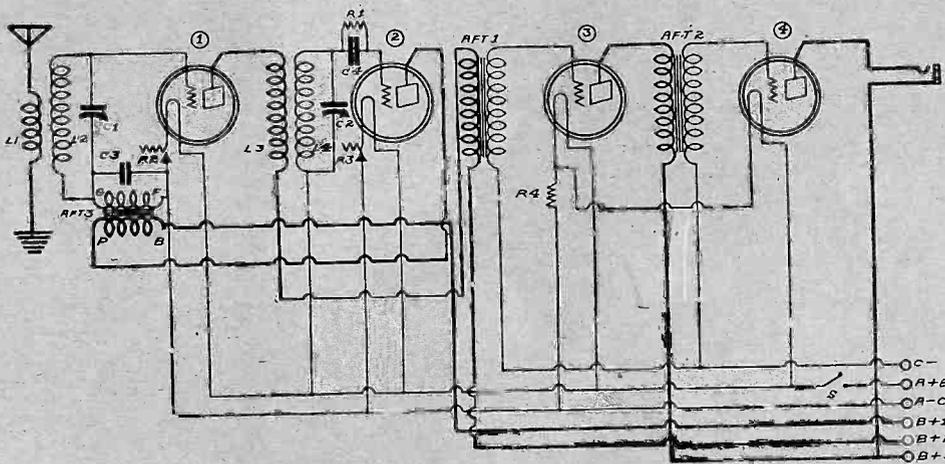
Test Circuits and Tested Hookups



THE CIRCUIT diagram of a set with a 1-turn primary. The RF tubes are connected in parallel, the filament of the first one being controlled by an Amperite and the filament of the second by a rheostat. The filaments of the other tubes are controlled by Amperites. The resistance coupled AF stages come before the transformer coupled AF stages.



HOW TO wire a rheostat to control the filaments of three tubes and ballast resistors to control the filaments of two more tubes in the same circuit.



A LOUD and selective 4-tube, 2-dial reflex. The first tube is an AF and RF amplifier, while the second tube is the non-regenerative detector.

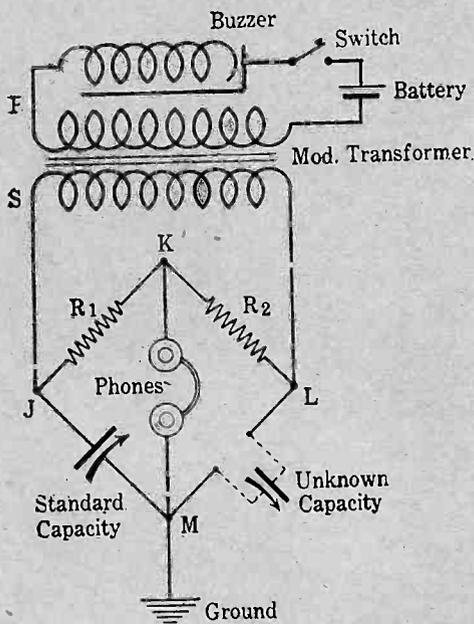
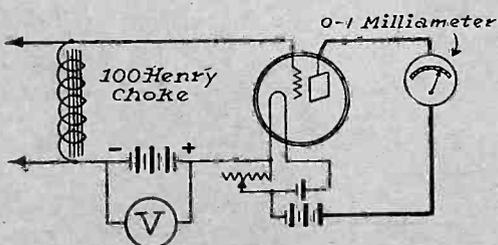
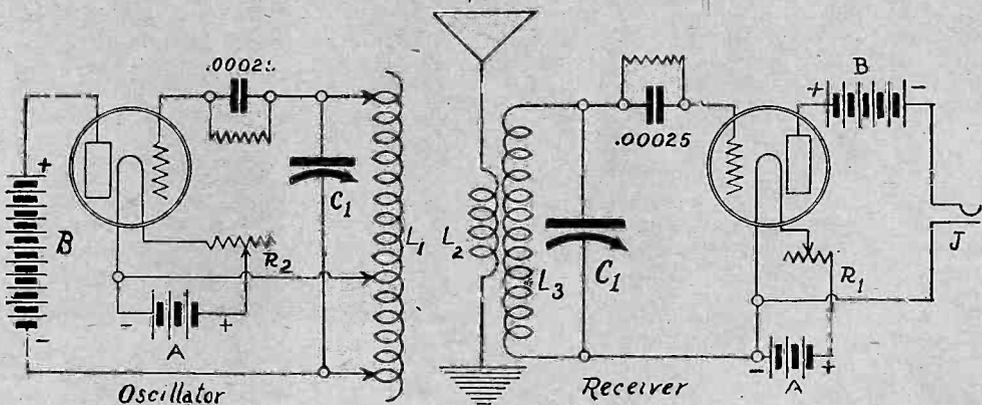


Fig. 1

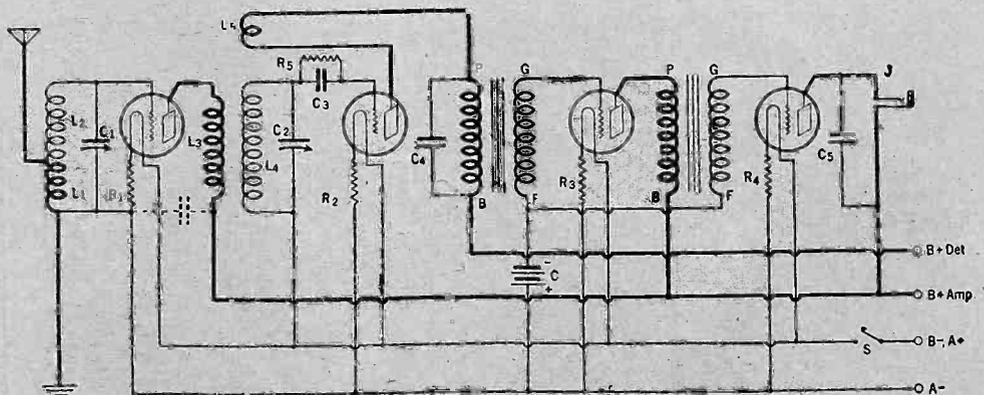
THE Wheatstone Bridge, whereby an unknown capacity can be found by variation of a known capacity.



HOW to measure resistance and impedance coupled units.



A METHOD OF hooking up an oscillator to a non-regenerative receiver, so that pure CW signals may be heard. This same system may be used in a Super-Heterodyne.



A 4-TUBE RECEIVER, employing a stage of tuned RF amplification, a regenerative detector and two stages of transformer coupled AF amplification.

Radio University

A FREE Question and Answer Department conducted by RADIO WORLD for its yearly subscribers only, by its staff of Experts. Address Radio University, RADIO WORLD, 145 West 45th St., N. Y. City.

When writing for information give your Radio University subscription number.

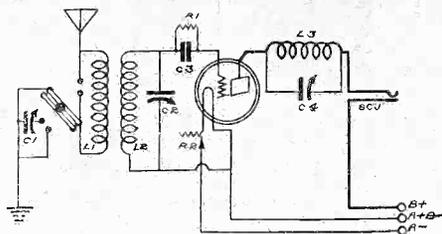


FIG. 396
The circuit diagram of the 1-tube regenerative receiver, with the shunt-series switch.

Set with a Novelty Switch Device

PLEASE GIVE the circuit diagram, with constants, of a 1-tube receiver, the plate to be tuned by a .00025 mfd. variable condenser. I have a series-shunt switch which I would like to use in conjunction with this set, to receive high or low waves. Please give a brief wiring description.—Jeanne Eichenbaum, 2948 West 31st st., Coney Island, Brooklyn, N. Y.

Fig. 396 shows the circuit diagram of the receiver used in conjunction with the condenser you requested. C1 is a .00025 mfd. variable condenser. C2 is a .0005 mfd. variable condenser, while C4 is another .00025 mfd. variable condenser. With the series-shunt switch, connected as shown in the diagram, the antenna and ground are connected to the primary. However, by shifting the position to adjacent posts, the condenser C1 is connected in shunt to the antenna and ground, thereby giving a tuning effect to the antenna. A regulation tuned RFT is used. The primary L1 consists of 10 turns. The secondary consists of 45 turns. These are wound on a tubing 3" in diameter. No. 22 double cotton covered wire is used. C3 is a .00025 mfd. grid condenser, while R1 is a 2 megohm grid leak. L3 consists of 35 turns wound on a tubing 3" in diameter, using the same kind of wire as was used for winding the primary and secondary of the RFT or antenna coupler. R2 is a 10 ohm resistance, controlling the filament of a -01A type tube. SCJ indicates a single circuit jack. The beginning of the primary L1 is connected to the antenna post and to a post on the switch. An adjacent post is connected to another such post and to the end of this winding. The last post on this side is left unconnected. The post directly opposite to the one carrying the beginning of the primary winding L1 is connected to the stationary plates of C1 and to the ground. The rotary plate connection of this condenser is brought to the third post on this side. The second post is left unconnected. The fourth and last post is connected to the ground. The beginning of the secondary winding L2 is brought to the rotary plate connection of C2 and to the F plus post on the socket. The end of this coil is brought to one terminal of the leak-condenser combination and to the stationary plate connection of C2. The P post on this socket is brought to the beginning of the plate winding L3 and to the stationary plate post of C4. The end of this winding is connected to the rotary plate post of C4 and to the top terminal of SCJ. The other terminal of this jack is connected

to the B plus 45 volt post. The rheostat is connected in the negative leg of the filament. A filament switch may be inserted in the positive leg of the A battery.

* * *

A 2-Voltage B Eliminator

I INTEND to build a B eliminator, using the Raytheon tube as the rectifier. However, I wish to use several articles, which I noticed were not included in those described in recent issues. I have a step-up transformer, which has a primary, tapped at a certain point and marked, 10% voltage tap. I also have a variable 10,000 to 100,000 ohms and one fixed resistance, 10,000 ohms. A circuit diagram of an eliminator using these parts would be appreciated. Will the value of the other parts remain the same?—Frank Phillips, 1036 46th St., Brooklyn, N. Y.

Fig. 397 shows the circuit diagram of the eliminator, using the parts you have. With the 10% voltage tap in the primary, it is possible to vary the voltage applied to the anodes of the tube, so that more or less voltage can be obtained at the output. The variable resistance R1 is inserted in shunt to the B plus detector and amplifier output. R2, the fixed resistor, is shunted across the B minus and B plus detector posts. The values of the other articles remain the same. C1 and C2 are 0.1 mfd. fixed condensers. C3 and C4 are 2.0 mfd. fixed condensers. C5 is an 8.0 mfd. fixed condenser. C6 is a 1.0 mfd. fixed condenser.

* * *

Coils That Increase Selectivity of Set

I HAVE a single circuit receiver, wired as per diagram. C1 is a .0005 mfd. variable condenser. L1 is a 50 turn coil, wound on a 3" diameter tubing, using No. 22 double cotton covered wire. This coil is tapped at the 10th, 20th, 30th and 40th turns. The tickler coil L2 consists of 36 turns wound on a tubing 2" in diameter, using No. 26 single silk covered wire. This coil is placed inside of the antenna coil, in the form of a regular tickler. The regular leak and condenser (.00025 mfd. condenser and 2 megohm leak) is employed. A -01A tube is used. A 10 ohm rheostat is used to control the filament of this tube. Now, although very loud signals are obtainable with this set, I find it difficult to separate stations. What can be done to cure this?—Gerald Marls, Pittsburgh, Pa.

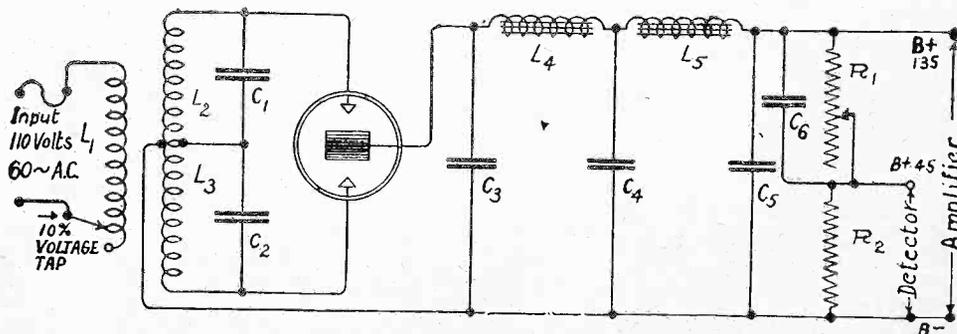


FIG. 397
The circuit diagram of a B eliminator, using the Raytheon tube, with a tapped primary and only two voltage outputs.

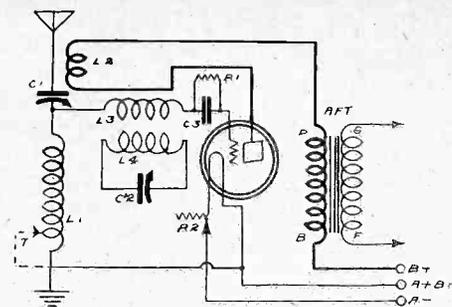


FIG. 398
The circuit diagram sent in by Gerald Marls, but with coils installed, to increase selectivity.

In Fig. 398 L3 is a 10 turn coil. L4 is a 45 turn coil. Both may be wound on a 3" diameter tubing or separately on 3" diameter tubings. In either case use No. 22 double cotton covered wire. L4 is shunted by a .0005 mfd. variable condenser C2. If the coils are wound on separate tubings place them about 1/4" apart. Also, if wound on the same tubing, place 1/4" apart. Using the separate tubings, wind the coils so that the entire form is taken up by the windings. Mount them so that their fields are parallel to each other. These coils will increase the selectivity. Little volume will be lost.

* * *

Coil Data for Set Using Crystal

WHAT ARE the exact constants of the coils and condensers used to construct the Crystal Set shown in diagrammatical fashion in the June 26 issue of RADIO WORLD?—Robert Byron, Asbury Park, N. J.

The primary L1 consists of 10 turns wound on a tubing 3 1/4" in diameter. The secondary L2 consists of 60 turns wound on the same tubing. No. 22 double cotton covered wire is used. A space of 1/4" is left between the two windings. The primary is tapped at every second turn, there being five taps. Three of these should be connected in the antenna circuit, while two are connected in the ground circuit. The secondary need not be tapped. The variable condenser that shunts L2 is .0005 mfd. C2 is a .001 mfd. fixed condenser. CD is the crystal detector.

* * *

Connection for Phones in Series

PLEASE GIVE a diagram illustrating the method of installing two pair of phones in series?—Louis Possenheimer, 214 20th St., West N. Y., N. J.

Fig. 399 shows the circuit diagram of the series method of connecting phones. The total output volume will decrease, but not to a great extent. The series method is the better one to use for multiple phone connections. The diagram is on opposite page.

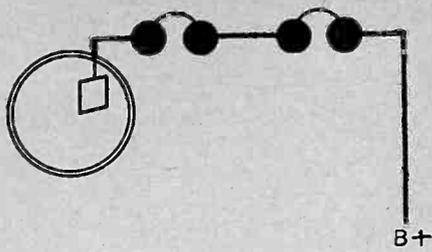


FIG. 399
Circuit diagram, illustrating the method of connecting up phones in series.

How to Employ Gain Control

I AM BUILDING the reversed feedback TRF set described in the July 31 issue. Could the feedback coil be variable? How should one tune the set?—Edgehill Williams, Nome, Alaska.

An extra control could easily be introduced which would make the distance of the one coil from the other a variable quantity. No doubt many ingenious ways could be worked out for control by this method. However, for the average user a fixed value seems to serve the purpose, as the filament rheostat on the left will give considerable latitude in regulating the volume and the distance getting ability of the receiver. The receiver operation is very simple if a certain procedure is followed. With everything connected up in the proper manner, pull out the battery switch. The rheostats are then turned up about three-quarters of the way, thus lighting the tubes. Starting from zero on the dials turn number 2 and 3 dials up about three degrees at a time keeping them fairly even. Number 1 dial, to the left, should then be turned several degrees each side of a reading corresponding to the other two dials until music or speech is heard. Both the center and the right-hand dials will read very nearly the same, while the left hand dial will read slightly above or below, due to the different types and sizes of aeri-als. It is always a good plan to keep a record of the station and the three dial settings so that a station may be found without fishing for it each time. For DX it is important to turn the dials slowly, otherwise the station may be passed over without even knowing it. The right-hand rheostat regulates the temperature of the amplifier filaments. This should be turned on until no further increase in volume is noted. It should then be turned back slightly. If this rheostat is left turned on further than necessary to give results the tubes will soon become paralyzed and their life materially shortened. The left-hand rheostat can be used as a volume control and for regulating the amount of regeneration. The best point of operation can easily be determined after a few trials.

* * *

1-Tube Reflex Using Crystal

I HAVE an Erla RF transformer, which is designed for use in a special reflex receiver designed by the engineers of the Electrical Research Laboratories, known as the "Erla Duo-Reflex." The circuit diagram of this set with wiring directions would be appreciated.—Jack Numen, Richmond, Va.

Fig. 400 shows the wiring diagram of this receiver. Only one tube is used. This acts as an RF and AF tube. A crystal acts as a detector. The circuit as given here allows the use of a loop for

local stations, through the medium of a loop jack LJ. To increase the sensitivity of the set, a .001 mfd. variable condenser is installed in series with the primary of the tuned RFT, this acting as a tuner of the antenna. The primary of this RFT consists of 5 turns. The secondary consists of 45 turns. Both these windings are made on a tubing 3" in diameter, No. 22 double cotton covered wire being used. Allow a 1/4" separation between the windings. The primary may be tapped. If this system is used, it will result in louder signals, with an extra control. The coil would consist of 20 turns tapped every 4 turns, giving you 5 taps. A .0005 mfd. variable condenser C1 shunts the secondary winding. C2 is a .001 mfd. fixed condenser, used for by passing RF currents. If the tapped primary is used, then three taps are connected in the ground circuit and two in the antenna circuit. The three in the ground circuit are from the end of the coil, while those in the antenna circuit are from the beginning of the coil. If the 5 turn primary is used, the antenna and ground are connected to the beginning and end. The beginning of the secondary coil L2 is brought to the inner bottom spring of LJ. The upper inner spring is brought to the end of the secondary winding. The bottom terminal of the jack is brought to the rotary plate connection of C1. It is also connected to the G post on the AFT. The top terminal on the jack is connected to the G post on the socket and to the stationary plate post of C1. The P post on this socket is brought to the P post on the RFT. The B post on this transformer is connected to one terminal of the phones and to one terminal of C2. The other terminal of this condenser is brought to the A minus post, not to the F minus post on the socket. The rheostat is connected in the negative leg of the filament. This A minus post connection is also brought to the F minus post on the AFT. This means that the secondary of this transformer is connected in shunt to the grid return-filament minus circuit of the RF tube. The G post on the RFT is brought to the high potential point of the crystal detector. The low potential point of the detector is brought to the P post on the AFT. The B post on this AFT is brought to the F post on the RFT. The B post on the RFT is connected to, as stated before, to one terminal of the phones. The other terminal of the phones is connected to the B plus post. The plus post of the A battery is connected to the minus post of the B battery. This latter connection is experimental. A high ratio AFT should be employed. If another stage of AF amplification is to be added, the primary is inserted in the output of the RF tube. That is, after the energy is passed from the RF tube through the RFT to the detector, it is passed back again to the RF tube for AF amplifying. The output of this new AF tube is then made to the primary of the new AFT. For louder signals, you may connect the end of the secondary winding

to the end of the primary winding or to the ground. A .001 mfd. fixed condenser across the F and G posts of the AFT may be used to better the volume. The -01A type tube works best in this receiver, with a plate voltage of about 90. The filament voltage, should of course be 6, this being controlled by a rheostat, having a resistance of 10 ohms, e. g., R1. This set is ideal for portable use, when a second stage of AF coupling is employed, as a loop may be successfully employed. The tuning is simple and logable. As a matter of fact, the set is really a 1-dial receiver, the antenna condenser, if such is used, not being very critical as to adjustment, once set. The secondary L2 may also be variable. That is, this may be like the rotor of a variocoupler. This necessitates another control and as usual giving a bit more volume.

* * *

Regeneration Is Maximum Point

SUPPOSING regeneration to be present, does any particular method of introducing it afford more effective sensitivity and greater volume?—August Drop, Tampa, Fla.

No. The objective is attained when the degree of reaction known as critical regeneration is obtained. Beyond that the distortion is severe and the amplification is lessened. The choice among the various methods of obtaining regeneration rests largely with the convenience served. For instance, for short-wave work the condenser feedback method is preferable, because easier to operate. A rotary tickler coil in the plate circuit would be extremely critical. For the broadcast band the rotary tickler coil is convenient and so is the fixed tickler with a variable resistor used for regenerative control. Of course, the system used must be effective on the highest broadcast wavelengths. Some sets fail to regenerate on the highest wavelengths, but this may be cured either by adding more turns to the tickler or by placing a small fixed condenser from the B plus detector post to A minus, particularly if an audio transformer follows the detector. This bypass condenser should be from about .00025 mfd. to .0005 mfd. The regenerative action that takes place in a set, when effective over the entire waveband, a requirement not hard to fulfill, improves the sensitivity very greatly. If regeneration is used in a radio frequency stage the volume will be increased considerably, but the preference of most designers is to use regeneration in the detector tube, because of minimization of radiation, including effectiveness of neutralization. Regeneration is about equal to a stage and a half of tuned radio frequency amplification. Regeneration may be regarded as the purposeful

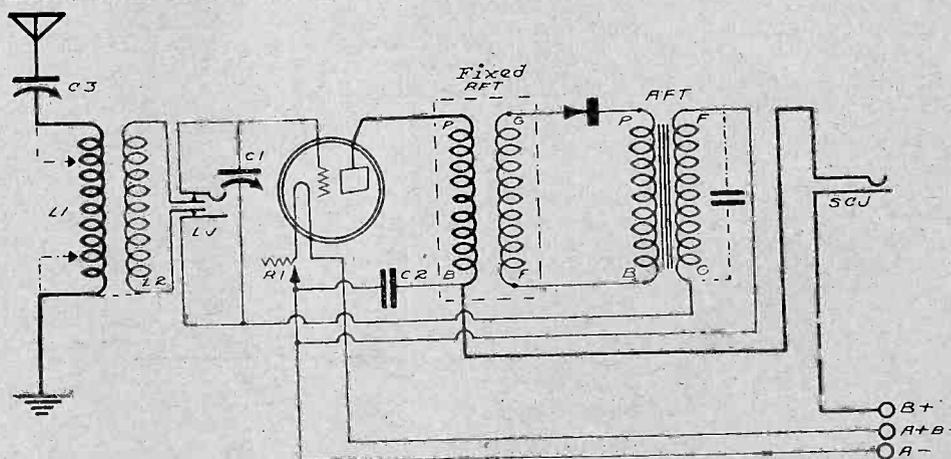


FIG. 400
The circuit diagram of the Erla Duo-Reflex, with slight modifications.

A 1-Dial Receiver

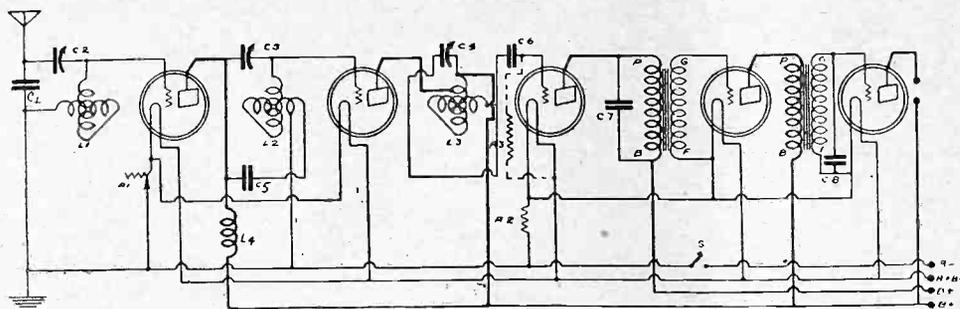


FIG 401

The electrical diagram of the Magnavox 1-dial receiver, type TRF-5, last year's model.

and adjustable introduction of a means of reducing the RF resistance by virtue of the phenomenon of vacuum tube operation. It is commonly defined as the feeding back of energy from the plate of the tube to the grid of the same tube, or the grid of some preceding tube. However, this does not agree with the most modern understanding of regeneration. It is still something of a mystery and is known rather by its effects than by the precise action.

The Magnavox Inductance Set

PLEASE GIVE the circuit diagram of the old Magnavox 1-dial set, wherein variometers are used for tuning.—Phillip Hersh, Niagara Falls, N. Y.

Fig. 401 shows the wiring diagram of this receiver. Standard variometers may be employed. L2 is tapped at the 8th turn from the beginning of the stationary coil. L3 is tapped at the 15th turn from the beginning of its stationary coil. C2, C3 and C4 are all .0001 to .00015 mfd. midget condensers known as "ratio condensers." C1 is a .001 mfd. fixed condenser. C5 is .0006 mfd. fixed condenser. C6 is a .0002 mfd. fixed condenser. L4 consists of 300 turns of No. 30 double silk covered wire, wound on a tubing 2" in diameter. C7 is a .001 mfd. fixed condenser. C8 is a .0005 mfd. fixed condenser. R1 is a 7 ohm rheostat, used to control the filament temperature of the two RF tubes. The filaments of the detector and two AF tubes are controlled by a 1-ohm resistance. The manufactured receiver has no grid leak, but it may be installed in shunt to the grid—A plus circuit. One of the variable type will work very well. The three variometers are ganged together and controlled by a single dial. The -01A tubes are used throughout the set, with a 6-volt A battery supplying the filament voltage. The plates of the two RF and AF tubes should receive about 90 volts. The plate of the detector tube should receive about 22½ volts. S is a filament control switch. The three small condensers are adjusted once and never touched unless the position of the receiver or the tubes are changed around, etc. This applies to the variation of the voltage upon the tubes in the RF stage.

A Variometer Short-Wave Set

PLEASE GIVE the electrical diagram and constants of the Grebe CR-13 receiver, used by the amateurs for short wave re-

ception. I understand that split variometers are employed in the tuning circuits. The -01A tubes are to be used.—Garreth Manuel, Yonkers, N. Y.

Fig. 402 shows the circuit diagram of this receiver. The RF tube is regenerative, the plate coil, L, accounting for the regenerative action of the tube. Each half of the stator and rotor windings of the first variometer consists of 19 turns. This means that there are 76 turns in the entire coil. No. 16 double cotton covered wire is used. The stationary tubing is about 2¾" in diameter, while the rotary tubing is about 3¼" in diameter. The plate coil L consists of 15 turns of No. 26 single cotton covered wire, wound on a tubing 4½" in diameter. This coil is placed in inductive relationship to the stationary winding of the variometer in the detector tube circuit. Each half section of the rotor and stator of this variometer consists of 23 turns, using No. 16 DCC wire. This means that the complete coil consists of 92 turns. R1 is a 300 ohm resistance used to control the oscillatory action of the tube. Rheostats having a resistance of 20 ohms may be used. The regular .00025 mfd. grid condenser and 2 megohm leak are employed. Note that the leak is in shunt to the grid-A plus circuit. C2 is a .001 mfd. fixed condenser.

How Ohmmeter Tells Resistance

WHAT IS the function of the ohmmeter? How is it made and by whom was it invented?—Grant Derman, Chicago, Ill.

In most electrical and radio engineering laboratories is found the instrument known as the ohmmeter. This is used for the purpose of finding the resistance of coils, condensers, etc. This instrument is

the invention of Professor W. E. Ayrton. Fundamentally it is made of two coils placed at right angles to each other, which act on a needle made of soft iron. One of these coils is made of a thick wire, while the other is very thin. The thick wire is placed in series with the material to be measured for resistance. The thin wire is placed in parallel to this same material. The action of one of these wires depends upon the total current delivered, while the other is effected by the voltage difference between the two points of the material containing this resistance. The needle deflection is accounted for by the ratio of the voltage difference to the resistance. The deflection of the needle at certain angles of the two coils will be proportional to the resistance of the material. When a current is passing through the thick coil, the needle points to zero. However when this same current is brought through the thin wire, which is of a high resistance, the needle moves and gives a reading.

A 3-Tube Set Without Taps

I HAVE an old variocoupler, having a 20-turn primary and a 62 turn secondary. Both are wound with No. 26 single silk covered wire. The secondary is variable inside of the primary. The primary is tapped at the every second turn, making a total of 10 taps. I would like to do away with the taps. I also have a large Pioneer variometer and a 23 plate variable condenser. I would like to use these parts in a 3-tube regenerative receiver, employing a regenerative detector and two stages of transformer coupled audio frequency amplification. The filament of the detector tube should be controlled by a rheostat, while the filaments of the two AF tubes should also be controlled by a single rheostat. The circuit diagram of such a set, with complete detector wiring directions would be appreciated.—Kling Casters, Newport, R. I.

Fig. 403 shows the wiring diagram of such a receiver. L1 indicates the primary winding, while L2 indicates the secondary. The taps are eliminated, you will notice, with a continuous winding substituted. This consists of 10 turns. The number of turns on the secondary should be reduced to 45. C1 indicates the variable condenser, which should have a capacity of .0005 mfd. Usually the 23 plate type, have this capacity. However, if you find that the higher wavelengths are not being covered, you can be sure that your condenser, has a lower capacity, in which case turns will have to be added. R2 is the rheostat, which is of the 10 ohm type. L3 is the variometer, used to make the plate generate oscillations. C2 and R1 are the leak and condenser combination, the leak having a resistance of 3 megohms, while the condenser has a capacity of .00025 mfd. C3 is a .001 mfd. fixed condenser which is optional. AFT1 and 2 indicate the

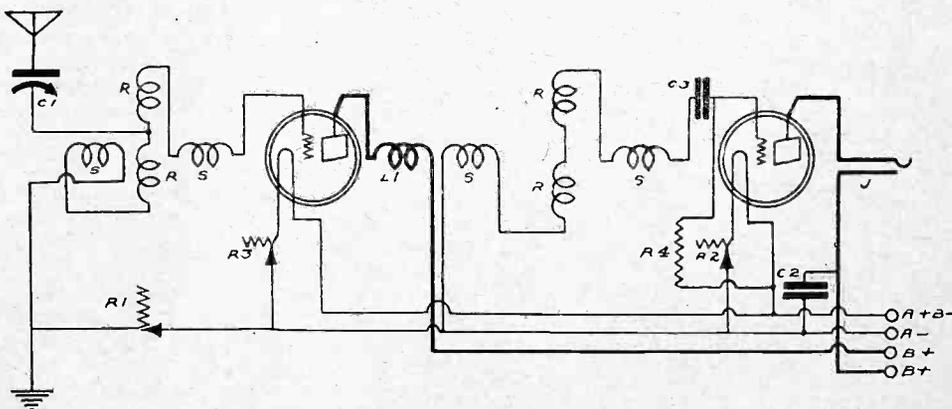


FIG 402

The circuit diagram of the Grebe CR-13, used for short wave reception.

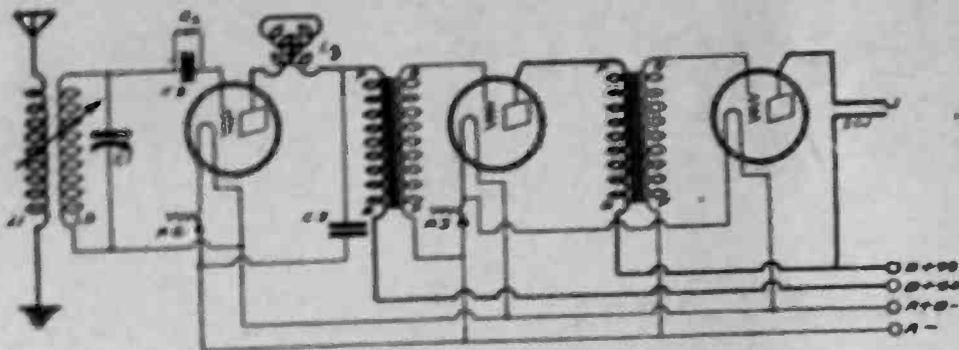


FIG. 403

The wiring diagram of the 2-tube regenerative set requested by Kling Casters.

audio frequency transformers, both of which are of the low ratio type. R3 is the rheostat controlling the filaments of the two AF tubes. This is of the 6 ohm type, being able to pass 1/2 amperes. SCJ is a single circuit jack. As to the wiring of the detector circuit. The beginning of the primary L1 is brought to the antenna. The end of this coil is brought to the ground. The beginning of the secondary coil L2 is brought to the rotary plate connection of C1 and to the F plus post on the detector socket. The end of this coil is brought to the stationary plate connection of C1 and to one terminal of the leak-condenser combination. The other terminal of this combination is brought to the grid post on this detector socket. The rotary post connection of the variometer L3 is brought to the plate post. The stationary post connection is brought to the post on the first AFT. It may also be brought to one terminal of the fixed condenser C3. The other terminal of this condenser may be brought to the A minus post on a strip, etc. The arm of the rheostat, R2 is brought to the A minus post, also. The resistance terminal of the rheostat is brought to the F minus post on the socket. The connections on the AF portion of the set can be followed out from the wiring diagram.

stationary coils of the coupler in the single circuit receiver. C1 is a .0005 mfd. variable condenser. L4 is the stationary coil of the coupler and consists of 40 turns tapped every 5th turn, wound on a tubing 3/4" in diameter. L5, the rotor consists of 25 turns wound on a tubing about 2 3/4" in diameter. This coil may consist of 36 turns of No. 26 SSC wire. C3 and C4 are .00025 mfd. grid condensers. R4 and R5 are 2 megohm grid leaks. C2, the variable series condenser of the single circuit receiver, has a capacity of .0005 mfd. The audio frequency transformer used, should be of the low ratio variety. One terminal of the two posts in the center of S1 is connected to the antenna. The other is brought to the ground. The post either on the bottom or top adjacent to the antenna post connection, is brought to the beginning of the primary L1. The post opposite is brought to the end of this

winding. The other post adjacent to the antenna connection is brought to the stationary plate post of C2. The only post left is now connected to the switch arm S and to the A plus B minus post. The rotary plate connection of C2 is connected to the beginning of L4 and to one terminal of the grid leak condenser, C4R5, combination. The beginning of the tickler coil L3 is brought to either the top or bottom post of S2 (not the center posts). The other lead of the tickler is brought to the plate post of socket 1. The post opposite the tickler connected post, is brought to the B plus, 45 volt post (B plus 2). The center post underneath the tickler post is brought to the B post on the AFT. The P post on this AFT is brought to the other center post. There are now two more posts left. The post underneath the B post connection is brought to the end of the rotary coil L5. The only other post left is connected to the B plus 45 volt terminal (B plus 1). The filaments are all connected in the negative leg. The grid returns of the two detector tubes are to the A plus, while the return of the AF tube is to the A minus. As to the manner of operation. When S1 is thrown to the left, the antenna and ground is connected to the primary coil and into the 3-circuit tuner circuit. When it is thrown to the right, the single circuit set is put in use. When S2, is thrown upward (reading from the diagram), the output of the 3-circuit tuner set is connected to the AFT. When it is thrown downward, the single circuit output is connected to the AFT. Be sure that the contacts on S, are solid and clean. Otherwise it will be difficult to obtain the individual characteristics of the set, due to resistance which may be present, obstructing current flow.

Changeover In 1-Tube Set

I WOULD like to have the circuit diagram of a system whereby it is possible to change from a single circuit 1-tube regenerative receiver to a 3-circuit 1-tube regenerative receiver, using a one-stage transformer coupled AF amplifier in both systems at will, so as to test the relative values of both types. The -01A type tubes are to be used.—Nelson Materas, Rye, N. Y.

Fig. 404 shows the circuit diagram of such a combination of receivers. S1 is a double throw, double pole switch, controlling the switching in or out of the input to the single and three circuit receivers. S2 is also a double throw, double pole switch, controlling the switching in or out of the output of these circuits to the amplifier circuit. To the left we have the three circuit tuner, while in the center, we have the single circuit receiver. To the right, we have the AF amplifier. Rheostats of the 10 ohm type are used to control the filament temperature of all the tubes, although the amplifier rheostat is unnecessary. A regulation 3-circuit tuner and a variocoupler is used. L1 the primary of the 3-circuit tuner, consists of 10 turns, wound on a tubing 3/4" in diameter. L2 is wound on the same tubing, with a 1/4" separation, consisting of 45 turns. The tickler, L3, consists of 36 turns wound on a tubing 2 3/4" in diameter, using No. 26 single silk covered wire. No. 22 double cotton covered wire is used to wind the primary and secondary. This same kind of wire is used to wind the rotary and

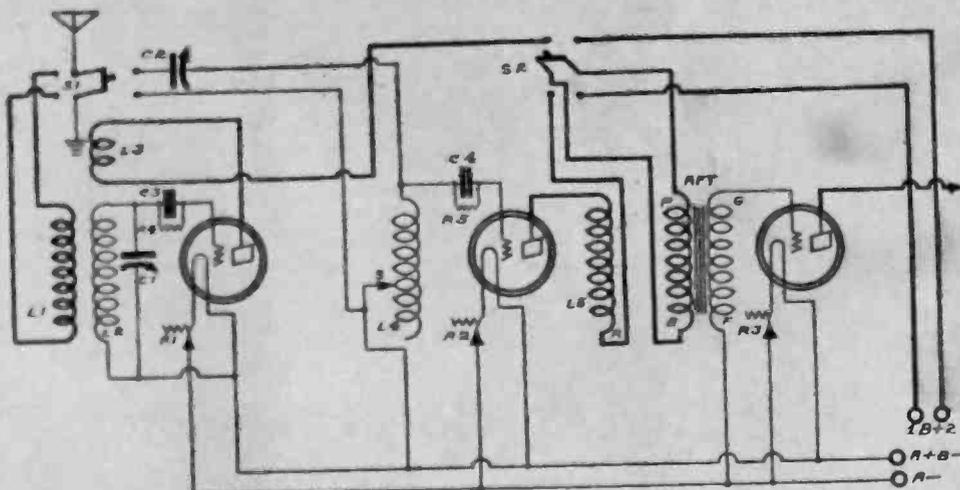


FIG. 404

The circuit diagram of the single and three circuit tuners hooked up to switches, for obtaining features of both receivers.

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This Service for Yearly Subscribers ONLY

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[In sending in your queries to the University Department please paragraph them so that the reply can be written under or alongside of each query. Write on one side of sheet only. Always give your university number.]

RADIO WORLD, 145 West 45th Street, New York City.

Enclosed find \$6.00 for RADIO WORLD for one year (52 Nos.) and also enter my name on the list of members of RADIO WORLD'S University Club, which gives me free information in your Radio University Department for 52 ensuing weeks, and send me my number indicating membership.

Name

Street

City and State

Stations Back Hoover; Put Conscience First

SHUN LEGAL RIGHT, KEEP OLD WAVES

**Preponderating Number
See Only Public Injus-
tice In Mad Scramble
for Preferment — Even
Dissatisfied Stick to Fre-
quency**

FEW BREAK AWAY

**Even Some of Them Re-
turn to Original Assign-
ment or Intend to Do So**

A canvass of principal broadcasting stations of the United States relative to their attitude toward seizing bootleg wavelengths and using higher power reveals that some stations throughout the country are about to change their wavelengths while a few others have done so. Most stand strictly behind the Government.

A telegraphic symposium by Eric H. Palmer, of the Freed-Eisemann Radio Corporation, particularly addressed to broadcasters allotted the lower wave bands, brought the following answers:

KTAB, Oakland, Calif.: "Now broadcasting 302.8 meters. More power and better reception. At conference last Wednesday local broadcasters decided to abide by Col. Dillon's decision of allocation of wavelengths. Pledge cards being signed by local stations to that effect. No confusion."

WDOD, Chattanooga, Tenn., by Earl Winger: "We expect to make no changes in wavelengths or power at this time. We feel that it is every station's duty to stay where it is with such unsettled conditions existing. We believe that most of the stations will feel the same as we do about it. We believe that the Government will take charge of matters and find some way out of the whole tangle."

KFWB, Hollywood, Calif. (Warner Bros.): "We will stay on our wavelength, also power given us by the Government, and will not change without being authorized by them."

WIOD, Miami Beach, Fla., by Jesse Jay: "Raising wavelength if agreeable to Department of Commerce. No increase of power for present. We believe all broadcasting stations should follow Department of Commerce recommendations which would eliminate confusion with present situation."

Will Do Some Scouting

KMMJ, Clay Center, Neb., by H. H. Johnson: "We expect to experiment with

Cry of Chaos Called Absurd

By B. W. Ruark

Executive Secretary, Radio Manufacturers Association.

Responsible opinion among radio manufacturing interests does not share the view that chaos in broadcasting, so freely and widely advertised since the Department of Justice's recent statement to Secretary Hoover will result from the failure of the last Congress to enact controlling legislation.

While the possibility of muddled conditions exists, it is a bare possibility only, for the radio industry has demonstrated a remarkable capacity for control within itself as a means of protecting the millions invested by the industry and the public in radio apparatus.

Established broadcasters realize promiscuous assumption of wavelengths will inevitably result in demoralization of radio reception with consequent loss of public good-will so necessary to the well-being of the industry.

Want No Risk

Those not altogether satisfied with wavelengths allocated to them prefer to maintain the status quo rather than run the risk of having their investment in broadcasting equipment impaired through generally unsettled conditions.

Few, if any, prospective entrants into broadcasting will risk the investment needed until Congress has had an opportunity to pass legislation definitely safeguarding such investment. These and other compelling considerations lead those in close touch with the situation to conclude that the public need not fear any serious interruption in broadcasting service, and that it can reasonably expect to realize on continued investments in radio receiving apparatus.

Exaggeration Danger

The real danger, insofar as any may be said to exist, lies in possibility that the public will attach too much importance to predictions of chaotic conditions. The large number of leading manufacturers making up the membership of the Radio Manufacturers Association are convinced that the common sense of most will hold a fretful few in awe and that there is no real basis for apprehension on the part of the public.

a higher wave. Have done broadcasting on 229. We are favorable to Government control, but as we have the privilege of scouting for a better wavelength we are going to try it."

WOHP, Detroit, Mich., by George Harrison Phelps: "Do not contemplate altering wavelength or increasing power without full approval of present Department of Commerce. Am unalterably opposed to making any move which may embarrass present officials or cause further complications of air. We are just as anxious as anyone for more power and different wave, but believe now is the proper time for all broadcasters to show co-operative spirit."

WMAK, Lockport, N. Y., by I. R.

WAMD FINDS NEW WAVE ALARMING

**Prepares to Quit 296.9
Channel for Its As-
signed Position of 244
and Cites Long List of
Reasons for Reversal**

IN HOOVER MIXUP

**Broadcast His Speech on
Bootleg Frequency —
Adheres to New Power**

Stanley E. Hubbard, managing director of WAMD, Minneapolis, Minn., sent the following telegram to RADIO WORLD:

"WAMD, the call of the North Hotel Radisson, Minneapolis, changed its wavelength to 296.9 meters and increased power to 2,000 watts. We broadcast Hoover's speech on this new wavelength but within a short time we possibly will go back to our regular wavelength, reasons being as follows: Loss of right through priority to our regular wavelength in case some other station adopts same; possibility of injunction or damage suit from another station on account of interference on their wave, also possible criminal prosecution by Government in case of malicious interference which would take place after Government notifies station of interference; possibility of breaking down rather than building up of goodwill and, above all, our desire to join all of the other large and popular stations throughout the country in co-operating with the National Association of Broadcasters and the Government and trade and listeners organizations.

"As a result of our one week's experience on another wave we found ourselves up against the same proposition as that which will confront any new station which attempts going on the air under present conditions."

The assigned wave is 244 meters.

WNJ, Newark, N. J., which went to 348 meters from 252, returned to its original wave in response to complaints from fans.

Lounsberry: "Though operating on crowded wave that seriously affects our results, we volunteer to remain under Department of Commerce regulations as heretofore in force. Not in sympathy with any other policy."

[The declarations of other stations will be published next week.]

Fans Asked to Strike Against Wave Pirates

OFFENDERS LISTED FOR BOYCOTTING

Broadcast Listeners Association of America, at Chicago, Instigates Reprisal Against "Unfair Stations, Known as Air Pirates"

WBBM'S POWER UP

**10,000, Instead of 1,500
Watts—Careful Modulation Promised As Interference Preventive**

(Special to RADIO WORLD)

CHICAGO.

The Broadcast Listeners Association of America, with headquarters here, issued a call to its members, asking compliance by all listeners-in, as well, to strike against stations that have taken a wavelength other than the assigned one, or that have increased their power without the sanction of the Department of Commerce. The strike call was accompanied by a list of stations classified as offenders.

The Association has resorted to the strike remedy in the hope that it will be effective throughout the United States, due to publicity given to the move in the newspaper and periodical press. Thus the call would reach hundreds of thousands, even millions of readers, thereby swelling the scope that the Association could encompass by mere solicitation of its own membership.

The strike remedy was invoked once before by the Association, about a year ago, when local listeners demanded a silent night, so that they could tune in for DX stations. Most local broadcasters agreed to this, but a few held out, and the strike was directed against them. Finally they were forced to give in and silent Monday nights resulted.

The present undertaking is national rather than local in scope, but it is hoped that if it is not nationally effective at least it will compel adherence to assigned wavelengths and power in the Chicago district and environs.

Explaining the reason for the strike call the association stated that it was due to the admission by Secretary Hoover that he was powerless to prevent wavelength grabbing or power changes.

"The association," read the announcement, "urges B. L. A. members in all parts of the United States to go on strike immediately against all unfair stations by refusing to listen to them at any time, under

Why WRNY Made Change

By R. W. De Mott

Secretary, Experimenter Publishing Co.,
(WRNY).

It is well known that since WRNY went on the air in June, 1925, it has had a great deal of trouble making its programs heard. At its former wavelength (258.5 meters) it was sandwiched in between WGCP on one side and WAAM on the other side, two local stations which, at all times when they were on the air, heterodyned WRNY's wavelength, making it impossible for thousands of listeners to enjoy the high-class programs of WRNY. Listeners in Jersey and the West Side of Manhattan found it impossible to tune in to WRNY.

The owners of the station are now happy to announce that, with the full sanction of the Department of Commerce, through Mr. Arthur Batcheller, Radio Inspector for the Second District (New York City), WRNY's wave has been changed to 374.8 meters (800 kilocycles), which is the only one open in this district at the present time, and accordingly WRNY went on the air at 374.8 meters with a midnight program on Wednesday, July 14. The station will continue to use this wavelength hereafter.

Situation Analyzed

From a technical standpoint, it might be said that this wavelength has caused no interference whatsoever in the local field. It is separated from WHN by 30 kilocycles, and from WOR by 60 kilocycles. For local stations the separation required by the Department of Commerce is 20 kilocycles, so it will be seen that in its new position WRNY will serve its listeners very much better than it was possible to do heretofore.

It will not heterodyne with any stations near its wavelength because the nearest stations on that wavelength are in Oklahoma and Arkansas, almost 1,500 miles distant. The power of those stations is small, so little heterodyning, if any, will ever be experienced, either in New York or elsewhere. On the other hand, WRNY's old wavelength of 258.5 meters had several stations as near as 400 miles, operating on exactly the same wavelength, and even when the locals, WGCP and WAAM were off the air, WRNY was still heterodyning with stations in Maine and Ohio.

There were actually 11 stations broadcasting on WRNY's old wavelength of 258.5 meters, making conditions intolerable, whereas on the new wavelength

any circumstances. Unfair stations are the ones now known as air pirates—the stations that jump their wavelength as originally allotted to them or which increase the power granted to them."

The association prepared the list of stations which it rated as unfair and forwarded to each member a copy of this list and a request that others be urged to use the boycott against the so-called unfair broadcasters.

WBBM, owned by the Stewart-Warner

there are only two stations in the entire United States, very widely separated.

Not only has this change in wavelength by WRNY improved its own broadcasting, but it has relieved and decidedly improved that of both WGCP and WAAM.

That this is true is best attested by some 3,300 letters, which are on file at the station, where they may be looked over by any one. There have been practically no complaints whatsoever, except from only eleven listeners, who have broken their receiving sets and who now find that they can not get WGY of Schenectady, although WRNY does not interfere with that station, and sets up no heterodyning at any point, either in New York City or anywhere else. Listeners throughout Pennsylvania, Connecticut, Massachusetts, and elsewhere report that WRNY does not interfere with WGY at any time, and both can be separated nicely.

Few Could Hear Station

The avalanche of letters descending upon WRNY shows most conclusively and decisively that only about ten to fifteen per cent of the set owners within Greater New York were ever able to get WRNY on its lower wavelength. In every instance the writers say that they tried to tune in WRNY, but could never get it, due to interference from other stations. Practically all of the letters congratulate the station on the change.

There seems to be some confusion on the part of a number of fans who have an idea that the change of wavelength gave the station more power. The reverse is actually true. The wavelength has nothing to do with the power at all. WRNY, at the present time, has an antenna input of 3 amperes, whereas on the old wavelength it used to radiate between 11 and 12 amperes. In other words, on the new wavelength it uses only a fraction of the old power. WRNY has not changed its rated power whatsoever. It is still broadcasting on 500 Watts.

The Experimenter Publishing Company, owners and operators of Station WRNY, have pledged themselves, if at any time, there be any civil authority constituted or any concerted action is taken by broadcasters toward a re-allocation of wavelengths, to take any wavelength whatsoever that may be assigned to WRNY, provided this wavelength is free from interference. The owners feel that the lower wavelengths, from many standpoints, have a great advantage over the higher wavelengths, and the remarkable distance records attained by WRNY on its old wavelength have proved this. With WRNY it is not a matter of a higher wavelength. The change was made for the purpose of broadcasting on some wavelength that is not interfered with by other stations, and which does not interfere with any other station.

Corporation, and operating on 226 meters, announced about the same time that the strike call was issued that it had decided to increase its power from 1,500 to 10,000 watts. The following statement was made by the station manager:

"The new power will not create any extra disturbance, since it is planned to modulate the augmented volume until the net result will be practically the same, from an interference viewpoint, as with the 1,500 watts."

Radio Law Ridiculous; Makes Hoover a Clerk

Denies More Power Than It Gives, Authorizing Stations to Select Own "Normal Wavelength" and Rendering That Meaningless By Allowing Subsequent Choice of Any Other—Congress Reserved to Itself Right to Establish Regulations, Leaving Secretary of Commerce Empty-Handed.

By *Herman Bernard, LL. B.*

Member of the New York Bar

RAMPANT confusion has attended interpretation of the Act of 1912, providing for the regulation of radio communication, until now, when the best legal authorities are agreed that the Secretary of Commerce has no power to refuse to issue licenses to prospective broadcasters, or to fix any certain wavelength or define the power to be used or the hours that the station may be on the air.

The clarification of the law, for purposes of practical application, started last April when Judge Wilkerson, in the Federal Court, Chicago, declared the Secretary of Commerce to be without power, and dismissed the criminal complaint lodged against the Zenith Radio Corporation (WJAZ, Mt. Prospect, Ill.) for using 329.5 meters, instead of the assigned or "normal" wavelength of 332.4 meters. It is interesting to note that WJAZ took a lower wavelength than the assigned one, while stations that have since changed their waves, due to Secretary Hoover's recent admission of lack of power, have substituted higher wavelengths.

It must be confusing to the layman to find that the Secretary of Commerce, who formerly was emphatic in his assertion of authority to control broadcasting, is now just as emphatic in the opposite direction. During the period when he was claiming the authority he was relying on a decision rendered in the District of Columbia that he did possess the power.

The Situation Summed Up

That his present view is the correct one, from a legal aspect, seems clear from a study of the Radio Act and decisions rendered thereunder. The situation is as follows:

1 The Act requires that before a station broadcasts it must have a license to do so, and that the Secretary of Commerce must grant the license if certain specified requirements are met. The first regulation of the Act provides that "Every station shall be required to designate a certain definite wavelength as the normal sending and receiving wavelength of the station," while other regulations confine the scope of selection between 200 and 600 meters.

2 The station must operate in conformity to certain regulations, but these regulations are stated in the Act, and are not ones upon which the Secretary of Commerce may exercise any discretion. As Congress reserved to itself

the right to fix these regulations, and has not changed them, the Secretary, no less than the stations, is bound by these enacted regulations.

This puts a touch of the ridiculous upon the whole situation, for the applicant for a station license picks his own "normal wavelength," the Secretary must accept it, and the station may use any other wave within the band. Thus a "normal wavelength" is a meaningless necessity in a license, and the official granting the license thereby surrenders all control over it. The law makes the Secretary a clerk.

Congress Sufficiently Informed

While the confinement of authority to make and amend regulations may not have been brought sensationally to the attention of Congress at the session recently ended, enough light had been shed on the situation to emphasize the necessity of enacting radio legislation. This Congress failed to do, because the House, which had passed the White bill, and the Senate, which in effect rejected the White bill for the Dill bill, could not agree on a compromise proposition before adjournment.

Secretary Hoover was not sympathetic with the Senate in its stand on radio legislation, because Senator Dill's amendment to the White Bill, constituting really a new act, created a Commission of Five to regulate radio, and stripped the Secretary of power. The White bill, on the other hand, gave the Secretary power he sought, in line with the recommendations of the Fourth National Radio Conference.

As legislation failed, the Secretary again was left with what power he had been given by the 1912 Law, which was enacted nine years before broadcasting began.

Law Is Antiquated

The law was enacted to apply mostly to the sending and receiving of dots and dashes, not the educational and entertaining programs, by voice and music, that we know today, and which constitute radio telephony, as distinguished from radio telegraphy. The 1912 law had telephony in view, but rather as the sending and receiving of spoken messages, not programs.

The Secretary thereupon restudied the decision in the Zenith case and presented the subject to the Attorney General for a clarifying opinion. When the Acting Attorney General perused the Zenith decision he found the following in the Judge's opinion:

"Section 2 of the Act provides that the license shall contain the restrictions,

pursuant to the Act, on and subject to which the license is granted. It is provided in Section 2 that the license 'shall state the wavelength or wavelengths authorized for use by the station for the prevention of interference and the hours for which the station is licensed to work.' It is further provided: 'Every such license shall be subject to the regulations contained herein and such regulations as may be established from time to time by authority of this Act or subsequent Acts and treaties of the United States.'

No Grant of Power

"There is no express grant of power in the Act to the Secretary of Commerce to establish regulations. The regulations, subject to which the license is granted, are contained in the fourth section of the Act."

William J. Donovan, Acting Attorney General, in his opinion submitted to Secretary Hoover, found along the same lines. Donovan said:

"The power to make general regulations is nowhere granted by specific language to the Secretary. On the contrary, it seems clear from Section 4 of the Act that Congress intended to cover the entire field itself, and that, with minor exceptions, Congress left very little to the discretion of any administrative officer. This fact is made additionally plain by the reports which accompanied the Act in both Houses."

The Commercial Question

Judge Wilkerson, in the Zenith case, said:

"The fifteenth regulation prohibits a private or commercial station not engaged in the transaction of bona fide commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes from using a wavelength exceeding 200 meters, except by special authority of the Secretary of Commerce."

This concerns another legal problem that existed prior to the Zenith decision. Commander E. F. MacDonald, Jr., of Arctic fame, president of the Zenith Radio Corporation and co-defendant in that case, and his attorney, Irving Herriott, maintained that WJAZ was unlike 95 per cent of the broadcasting stations, because the majority was just broadcasting stations, while WJAZ was one of the few engaged "in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes," quotation being from Regulation 15 of the 1912 Act.

It was their contention that as the

Crisis In Wavelengths Puts Stations On Honor

"If Stations Proceed to Select Their Own Wavelengths and Choose Their Own Time, Considering Only Their Own Selfish Advantage, Effective Public Service Will Be at An End," Was Hoover's View Last April, and It Holds Good Now

regulation exempted such stations from preclusion from the 200 to 600 meter band, WJAZ, because of its ownership by a radio manufacturing corporation, was in a special class. Indeed, even after the decision was handed down, in which Judge Wilkerson did not specifically go into this phase of the question, it was maintained by WJAZ that the decision did not authorize broadcasting stations in general to use any wavelength within the band that they saw fit.

Regulation 15 may be regarded as being in two parts. (1) The first opens the 200 to 600 meter band to a "private or commercial station engaged in bona fide commercial business by radio communication," and the other (2) opens it to stations engaged "in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes."

Contrary View

Commander MacDonald, following the Zenith decision, in a statement (published in full in the April 24 issue of RADIO WORLD, page 19), said:

"The only question raised in the test case in Chicago is whether or not the Secretary of Commerce has the right arbitrarily to assign wavelengths and hours of operation to stations engaged in one of the two above-described classes. The Zenith Radio Corporation comes within the latter class. The great majority of stations are not in either class, and no broadcasting stations other than those engaged in the two special classes described by Congress can operate on a wavelength in excess of 200 meters, without special authority from the Department of Commerce. No one has ever claimed otherwise and the Secretary's power in that respect is not being questioned in the Zenith case."

Nevertheless Judge Wilkerson by inference had held that even broadcasting stations in general came under Regulation 15, since the Court did not distinguish "bona fide commercial business" or "experimentation in connection with the development and manufacture of radio apparatus for commercial purposes."

Cleared Up By Donovan

However, the distinction not having been specially made in the decision, the question could not be deemed to be adjudicated by inference. This point was cleared up in the opinion rendered by Donovan to Hoover, for he stated that, in his estimation, broadcasting is "the transaction of bona fide commercial business." The Donovan opinion was published in full in the July 24 issue of RADIO WORLD, pages 4, 5 and 6, and from this the following quotation is taken:

"....it is suggested that under the fif-

teenth regulation broadcasting stations may not, without special authority from the Secretary, use wavelengths over 200 meters of power exceeding one kilowatt. This regulation is applicable only to 'private and commercial stations not engaged in the transaction of bona fide commercial business by radio communication.' I am of opinion that broadcasting is 'the transaction of bona fide commercial business' and that it is conducted 'by radio communication.' Broadcasting stations, therefore, do not fall within the scope of the fifteenth regulation; and the Secretary is without power to impose on them the restrictions provided therein." (Denial of right to operate within 200-600 meters.) From the foregoing considerations I am forced to conclude that you have no general authority under the Act to assign wavelengths to broadcasting stations, except for the purpose of designating the normal wavelengths under Regulation One."

Certainly Commercial

That broadcasting is commercial is just as obvious as is the fact that it is conducted by radio communication, for stations are operated for commercial advantage, although it is of no importance that many stations do not show a direct profit in dollars. The good-will they build up is an incentive to the sale of wares or intangibles. Even a church operating a station would have to be deemed to be in commerce, from the legal viewpoint, the owner's aim being the promotion of the religion it preaches. And besides, the "commerce" referred to is the inter-state nature of broadcasting that itself constitutes "inter-state commerce."

Secretary Hoover was not in Washington when the Zenith decision was handed down, but on his return to his office he issued a statement which showed that he clearly realized that the Zenith decision held that he had no authority, for in this statement he said:

"The Chicago decision denies the authority of the Secretary of Commerce to assign either wavelengths or time of operation."

Hoover Prophecies Chaos

There it was in a nutshell of nineteen words.

He added that Congress had the power to confer the necessary authority, which all agree is true. He spoke in a friendly way of the White bill, which had passed the House, and dismissed without comment the proposal, of Senate origin, to create a special commission to regulate broadcasting.

In this same statement he brought up the now-famous prophecy of chaos in these words:

"While the holding is in conflict with an earlier ruling in the District of Columbia, it is apparent that under the present Law of 1912, as now construed, no one has authority to protect the listening public against utter chaos in the service upon which it has come to rely.

"If stations proceed to select their own wavelengths and choose their own time, considering only their own selfish advantage, effective public service will be at an end."

Showing Up the Senate

Departing from legal consideration of the present problem, one finds in Secretary Hoover's words of last April (published in full in RADIO WORLD, May 8) an excellent presentation of his attitude toward the appropriation of wavelengths by stations that take advantage of the loopholes left by the Law of 1912.

Only a very meagre percentage of the more than 530 broadcasting stations have changed their wavelengths, power or time on the air in consequence of the now free admission of lack of power vested in the Secretary to prevent them.

But it is clear that Secretary Hoover has as great a contempt now for any such action as he had last April, and that stations that usurp wavelengths and hours on the air will be in ill repute before whatever duly constituted authority will administer the radio field under the enabling legislation to be enacted by Congress when it reconvenes in December.

It is also clear that Secretary Hoover, while not responsible for the present crisis, is standing by, so that the public will come to a full realization of the predicament in which the Senate has left it. Thus will Congress be forced by public opinion to do what no other agency has been able to compel it to do—enact adequate legislation.

Lessons Popular

Nearly 500 students have been enrolled and are studying in the classes in elementary review being conducted at WGN by Colletta Deignan, Chicago teacher and graduate of the Chicago Normal college. Her work deals with corrective English and mathematics, with considerable attention to correct speaking in which, it has been found, many errors are made.

A large number of adult listeners is enrolled in the class, although it was designed primarily for children in the grade schools with regular work to make up.

Miss Deignan's classes are broadcast each day except Saturday and Sunday, from 10:15 to 10:45 a.m.

TUBE LONGEVITY TESTED



(Underwood & Underwood)

VACUUM TUBES being tested for their duration of life in a test rack. Each tube is tested with precision instruments.

Right Lighting Improves Music

LOS ANGELES.

The subject of lighting effects for the studio has been given a great deal of serious consideration by KNX, the "Evening Express" radio station. Artists are enabled to work under the best possible conditions so that their work can be of the highest calibre.

Different colored lights are brought into use for various kinds of music.

Not only is the arrangement better for the musicians but for the ardent fans who visit the studio in the evenings. Although it does not go out over the air literally, the studio effect is beneficial.

Wrong Time Causes Mixup

Graham McNamee, WEAf announcer, while signing off at the close of a Goldman Band Concert took his watch from his pocket and gazed at its crystal face. Unfortunately in taking it from his pocket he turned the stem wind, setting the time-piece back several minutes. In his best announcer voice he signed off with the statement, "It is now 10:08 Eastern Daylight Time."

The right time was 10:22, so many who relied on the usually trustworthy announcer were late to work by 14 minutes or so, having "corrected" their timepieces accordingly.

Australia Plans To Pay Stations

WASHINGTON.

Future control of radio in Australia was one of the chief subjects discussed at a recent interstate wireless conference in Sydney, according to a report to the Department of Commerce. The conference recommended that the Federal Ministry be asked to appoint an advisory board to assist in the administration of broadcasting stations.

It was requested by the conference that a commission be appointed to determine

ways and means of providing more satisfactory radio service. A motion that wavelengths be standardized at from 200 to 400 meters was tabled. A request was made that the Postmaster General prevent interference with broadcasting by commercial and naval wireless stations, and radio monopolies were denounced.

Discussing license fees, the conference agreed to provide revenue for the class B stations in view of the value of their service.

How to Get U. S. Time

Special Receiver Brings
Waves—Relayed Transmissions
on Broadcast

By Leon L. Adelman

The Chas. Freshman Co., Inc.

Among the free and very important radio services rendered by the Government is the transmission of time signals. Every day and every night throughout the entire year, as regularly as can be, radio time signals are broadcast from powerful code transmitting stations at precisely definite intervals of time. These signals are based upon Naval Observatory time and may be picked up by radio receiving sets which are capable of tuning to the required wavelengths.

Since the transmission of radio waves is practically instantaneous, the accuracy of the received time is not affected. And you don't need to know the code to set your watch or clock by these time signals. The transmission simply consists of a series of dots covering a period of five minutes and ending with a long dash which indicates the exact even hour.

Sometimes broadcast stations relay the time signals from one of the high power stations. "Relaying" consists in picking up the time signals by means of a suitable receiving set and impressing the sound of these signals upon the microphone in the studio of the broadcast station in just the same way that voice or music is impressed upon the microphone. You cannot hear the original time signals with a broadcast receiving set because such a set will not tune to the long wavelengths used to send out the signals.

List of U. S. Senders

There are seven powerful Government stations scattered around the coast line which performs these invaluable services. Here is the list:

NAA, at Arlington, Va., wavelength, 2,650 meters, transmits time signals at 11:55 A. M. and 9:55 P. M., E. S. T.

NAT, at New Orleans, La., wavelength, 1,000 meters, transmits at 11:55 A. M., E. S. T.

NAJ, at Great Lakes, Ill., wavelength, 1,510 meters, transmits at 10:55 A. M., C. S. T.

NPW, at Eureka, Calif., wavelength, 2,000 meters, transmits at 11:55 A. M., P. S. T.

NPL, at Point Loma, Calif., wavelength, 2,400 meters, transmits at 11:55 A. M., P. S. T.

NPH, at San Francisco, Calif., wavelength, 2,400 meters, transmits at 11:55 A. M., P. S. T.

All that is necessary to receive these stations is a single tube set. Of course it does not necessarily follow every single tube set is capable of receiving over sufficient distances, but with favorable conditions, it is possible.

A simple piece of apparatus known as a loading coil, a relatively large inductance with a number of taps taken off, is necessary to add to your single tube or multi-tube set, so you may tune high enough. If you have a 5-tube set of the tuned radio frequency variety it is better

and Read the Signals

them in on the Original
tion Enables Reception
ast Sets

to leave it untouched and build a separate
set.

How Time Is Sent

Immediately following the transmission of the time signals there follows the latest weather report for various sections of the country. This is sent in International Morse code (Continental).

Following the weather report come what are known as press reports, and here is where the man who knows the code finds himself a step ahead of his friend who doesn't know it. He need not wait for the newspapers to appear to learn the latest news. He not only finds himself ahead from the news point of view, but has spent a very enjoyable half an hour or so in getting the information. The copying of code, the mental process involved in transcribing it into the characters of the alphabet and the thrill of accomplishment should be great enough to cause you to learn it—even if just as a mere pastime.

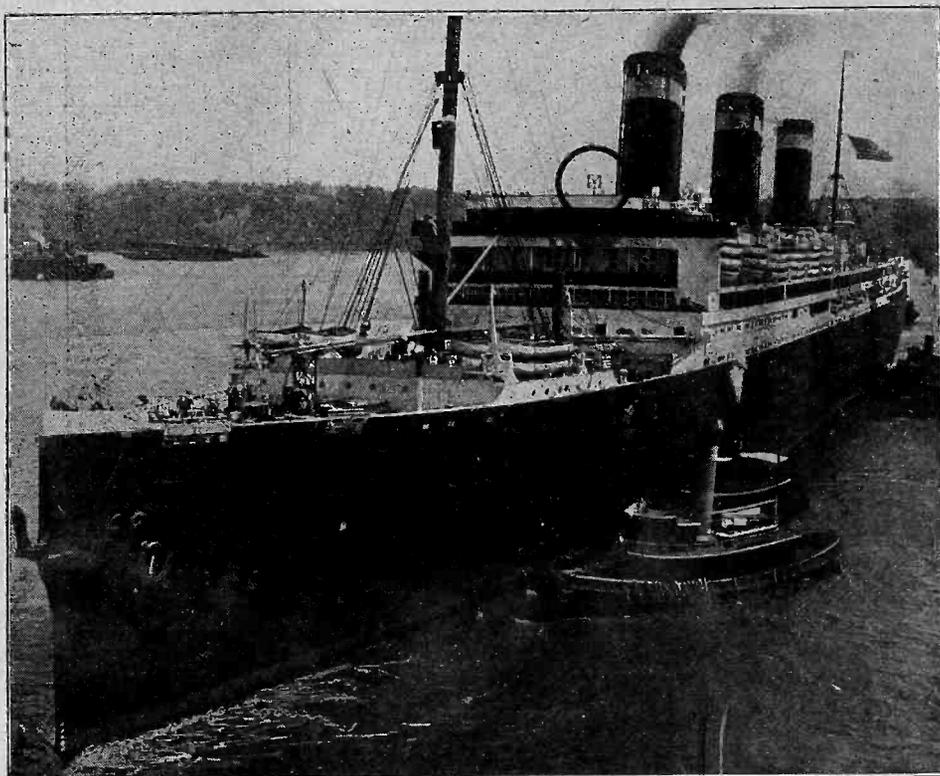
Suppose we desire to hear time signals from Arlington, NAA. You will recall that I mentioned that NAA transmits at 11:55 A. M. and 9:55 P. M., E. S. T. Suppose again that we wish to listen in tomorrow evening, since tonight's time signals from NAA are now speeding on their way to eternity. At 9:54 E. S. T., which will be 10:54 Daylight Saving Time, we tune to 2,650 meters. Presently, one minute later, a series of well-spaced dots—one every second—greet our ears. We hear 28 of them in succession and then the 29th is omitted. Then starting with the 30th and up to and including the 54th we receive a dot for each second. From the 55th to 59th seconds, no dots are transmitted and the procedure is repeated for the second, third and fourth minutes. The fifth minute is the same as the others except that the 50th to 59th seconds are omitted. Then at the exact even hour there is a long dash. This time is absolutely accurate and is found invaluable by watchmakers and jewelers throughout the country as well as by others who have realized the great value.

Power Tubes Stand Strain

Power tubes designed for use in the last stages of radio sets are designed to deliver a greater volume of signal to the speaker than can be obtained with other tubes without overloading.

The dry-cell power tubes are especially effective for use in operating speakers from dry cell tubes. Certain storage-battery and light-socket tubes deliver enough signal volume to furnish music for dancing in large halls. Power tubes are usually operated with higher B battery and C battery voltage than other tubes and must therefore be used in sets equipped with separate B and C battery terminals for the power tubes.

LOOP SAFEGUARDS SHIP



(Herbert Photos, Inc.)

THE LOOP antenna used in conjunction with the radio direction finding compass, aboard the huge S.S. Leviathan, is seen above (in circle), just over the bridge. Although very large, it is a mere speck by comparison with the massive ship.

Mother of Four Reduces 18 lbs.

She isn't "five-foot-two, with eyes of blue" but she is five-foot-four, has four children and confesses to being thirty-four. She weighed 148 pounds—"too fat for her vanity." The prescription this Washington, D. C., woman wrote for herself was fifteen minutes a day under Arthur Bagley, radio exercise director of the Metropolitan Life Insurance Company, whose tower health exercises are broadcast daily from the tower at Madison Square, New York, through WEA, WEEL, WCAP and WGR.

"I started in with a will and before I knew it I weighed 130 pounds," she writes. "So thinking I was beautiful then, and plenty slender enough for my height, I quit taking the exercises. But I do take them occasionally, if I have the time, which isn't very plentiful with four children to care for. But I never fail to listen to the entire hour, which is interesting.

Auction Bridge On Air Again

The auction bridge series will be resumed on Tuesday evening, October 19, at WEA. The program during the coming season will be weekly instead of on alternate weeks as was the case last year. The program will be heard through WEA, WEEL, WCAE, WTAM, WFI, WWJ, WSAI, WGN, WOC, WCCO, and KSD.

The women folk are particularly interested in bridge.

On Wednesday evening, October 6, the Smith Brothers will again be heard in their program of tuneful duets. The stations which will broadcast this program will include WEA, WTAM, WGR, WCAP, WCAE, WWJ, WSAI, KSD, WOC, WCCO and WDAF. While WSAI at Cincinnati will begin taking these programs during the month of October, after that month they will be taken only on alternate months.

Close Watch Kept By the Supervisors

WASHINGTON.

One station was licensed and one discontinued.

Radio supervisors at Chicago, Detroit and New York reported that some stations in these cities were changing their wavelengths but that all of them were doing it cautiously in order to prevent local interference. As distance reception is not at its best during the Summer months, Chief Radio Supervisor W. D. Terrell does not believe these changes will make any serious difference now.

So far, Mr. Terrell says, none of the stations in New York, Chicago or Detroit has applied for a change in wavelength. Such a procedure is not necessary, of course, but the local radio inspectors are instructed to keep the Department informed of such developments.

The new station is WKBA, Arrow Battery Co., Chicago, Ill., 288.3 meters.

The discontinued station is WOWL, Owl Battery Company, New Orleans, La., 270 meters.

[See station list, pages 22 and 23]

HEARS STATIONS ALL OVER WORLD



If you try for DX and fail to receive a particular station, why just go after it by automobile! M. F. Richards accomplishes that as an incident to his third world tour, during which he tunes in broadcasting in every civilized country, and then some. Mr. Richards is shown receiving the good wishes of Alfred Wragge, head of the radio department, Selfridge's, London, and C. Hart Collins, London radio manufacturer, in front of the Freed-Eisemann Building, Brooklyn, N. Y.

To Become Brilliant First Be Interested

Lesson Is Taken From Life of Steinmetz as Broadcast
by WGY—The Student Doubted Everything Until
He Tried It

By John Hammond

Undoubtedly a large part of every days' work, throughout the whole world, is done by electricity.

Yet electricity has been of practical use to mankind only since 1880. And for a number of years it was employed to a limited extent only; the machines which produced it were decidedly crude.

Steinmetz was one of the greatest of those men who discovered facts about electricity. He did his work through mathematics, which includes such subjects as algebra, geometry and trigonometry. He had a most unusual brain, but his body was sadly crippled, and he was a dwarf, scarcely more than four feet tall.

Had Social Instinct

He was much more than a mathematician, for he was interested in many of those matters which have to do with human happiness. He believed everyone should obtain as fine an education as possible. He was interested in boys and girls all his life. He liked to be out-of-doors, and he had a little camp on a creek near his home city, where he enjoyed paddling a canoe. He was fond of queer varieties of plants, and he had a great liking for all sorts of pets.

Most of all, Steinmetz knew how to think. And he was a man of peaceful purposes, kind-hearted and anxious to make life pleasant for others.

The story of Steinmetz goes back to a home in Breslau, Germany, where, on April 9, 1865, a son was born to Carl Heinrich and Caroline (Neubert) Steinmetz. They christened the baby Carl August Rudolf.

It is interesting to know that when the boy Steinmetz first went to school he had rather a hard time with the multiplication tables. But by the end of a few years, pa-

tient and persistent work had its effect; he began to find his studies interesting.

Became Interested and Brilliant

As soon as he became interested he became brilliant. When he entered high school in Breslau, he was one of the quickest pupils in mathematics the instructors had ever seen.

One of these instructors was Professor Fechner, a lecturer in philosophy. Professor Fechner had a peculiar method of acquiring knowledge. He never took anything for granted. Instead, he always questioned a statement, no matter if it were the expression of a learned man, or appeared in a noted book.

Professor Fechner explained this method to young Carl Steinmetz, who was then an earnest youth of about fourteen or fifteen. Carl thought it a most interesting idea. He began to follow it himself. He refused to accept anyone else's statements, even about something that seemed to be very plain; he had to work it all out himself.

The New Magnetic Law

From that time, all through his life, he proceeded in this manner. One day, many years later, he was reading some statements which other men had written about a certain law of electrical magnetism.

These statements he would not accept without making his own investigation. And in doing this he discovered that one of the other men had made an error; more than that, he found that neither of them had followed the matter far enough. He went into the subject more deeply, and thus discovered a new magnetic law.

In 1882, Carl Steinmetz entered the University of Breslau. About that time, the university added a short course in electrical engineering; and in his fourth year

Steinmetz took this course in addition to his other studies. He also conducted some crude electrical experiments in a little laboratory he had built at home.

Less than a year before Steinmetz expected to finish his studies at the university, and after he had begun working on his graduation essay, he found himself in difficulties with the authorities.

Suspicion had fallen upon him because he had long been connected with the political movement which developed as a protest against the tyranny of Bismarck. Shortly afterward he had to flee to Switzerland to escape political imprisonment.

He spent a large part of the following year studying at the Zurich Polytechnical School in Zurich, Switzerland. He had so little money that he had to tutor continually, and he also earned small sums by writing articles for the newspapers.

Toward the spring of 1889, a young man named Oscar Asmussen, who had been Steinmetz's friend and room-mate in Zurich, received word from his relatives in America to come home at once. He had grown so fond of his friend Steinmetz that he offered to pay Steinmetz's passage if the latter would accompany him to America.

Gets Letter and Goes

Steinmetz, who had been longing to reach the United States, quickly accepted the offer, promising to pay Asmussen back at the earliest opportunity. Before they left Zurich, he was fortunate enough to obtain a letter from the editor of a German electrical publication for which he had written articles. This letter was to introduce him to a certain Rudolph Eickemeyer, who had an electrical establishment in America.

The eight-day voyage from Havre to New York was the most pleasant trip Steinmetz ever took, according to the way he used to speak of it in later years.

When they reached New York, at it was Saturday, the steerage passengers were held on board until the following Monday. Sunday night the weather turned chilly, and a damp wind, blowing in upon Steinmetz through an open port as he slept, gave him a severe cold. He awoke in the morning with one side of his face badly swollen.

Was Sorry Spectacle

Feeling far from well, and looking even worse than he felt, the young German immigrant, accompanied by Asmussen, walked up the gang plank a little later and appeared before the immigration officers at Castle Garden. It was a crisis in his life—and it would have had an unfortunate outcome if he had been compelled to make his way that day alone.

His swollen face, lack of money, in ability to speak English and generally forlorn appearance caused the immigration authorities to shake their heads. Questioning him, as they did all the immigrants, they received only puzzled answers, mostly in German. When they asked him if he understood English, he answered: "A few."

They therefore decided that he could not be permitted to land and ordered him sent to the detention pen, to be deported to Europe. But Asmussen saved the day for his friend. Asmussen spoke English fluently. He showed a good-sized sum of money which, he declared, belonged to them both. He offered to be responsible for Steinmetz, and to see that the latter did not become a public charge.

The appeal of Asmussen caused the officers finally to reverse their decision. They allowed Steinmetz to land upon the shores of America.

During his first few days in the new country, the young immigrant tried to find work in New York and Brooklyn, but, without result. He finally got a job in Yonkers.

(Broadcast from WGY)

R. C. A. to Continue WEAF

PURCHASES

THE STATION OF A. T. & T.

Will Get Title by January 31—WJZ to Be Retained, Too—Buyer Enters Time Selling Field, Gets National Outlet

PATENTS INVOLVED

Parties Exchange Concessions — Telephone Co. Definitely Out of Radio, Excepting Line Tieup

WEAF, 492 meters, New York City, has been sold by the American Telephone & Telegraph Co. to the Radio Corporation of America, owners of WJZ, 455 meters, New York City, and of WRC, 469 meters, Washington, D. C. What will become of WCAP, 469 meters, the telephone company station in Washington, was not disclosed. It is expected either WCAP or WRC will be discontinued.

Title to WEAF will pass to the R. C. A. before January 31. Both WJZ and WEAF will be retained in undiminished service.

The price to be paid for WEAF has not been settled, as the monetary consideration is not the outstanding one. The withdrawal of the telephone company from the radio field and the mutual exchange of patent concessions are more important to the principals.

The outstanding significance of the sale is the decision by the A. T. & T. to let radio alone, except for leasing telephone lines for chain broadcasting, a field it developed with vigor. The sale assumes the decision that radio was not found dependable for the exchange of spoken messages. The A. T. & T. will concentrate on wired telephony exclusively.

Two effects of the sale are to put the R. C. A. in the commercial broadcasting business for hire, and to give it national distribution by linkup with the WEAF chain.

While WEAF charges advertisers for time on the air, WJZ has been content to let advertisers pay for excellent talent, but has not accepted pay for the microphone privilege. The R. C. A. promises to make no "violent change" in WEAF policy, hence will enter the "time for sale" field of broadcasting.

Now the R. C. A. relies on WJZ and WRC, with occasional tieup with the General Electric station, WGY, 380 meters, Schenectady, N. Y. With WEAF in its possession the R. C. A. has access to the country at large through linked stations, although it must lease telephone lines. It will probably use its super-power transmitter (WJZ at Bound Brook, N. J.) for this work.

The following statement was issued by the A. T. & T.:

"Arrangements have been completed for the sale of Broadcasting Station WEAF to the Radio Corporation of America. The actual transfer will take place before the end of the year.

"It has always been the purpose of the A. T. and T. Co. not only to improve the known means of telephone service but to seek any new means which would further facilitate electrical communication. This company, therefore, undertook to develop radio broadcasting in order to discover how it could be made most useful in our business.

"That the Bell System might be enabled to utilize any new means of communication, the A. T. and T. Co. established a broadcasting station in New York for the purpose of continuing the physical experiments in this art and also to experiment in its commercial possibilities. This station, WEAF, was equipped with the best available apparatus known to the art. It was organized to develop the best possible programs and make a careful analysis and study of the reactions on the part of the public to these programs. It was also designed to determine the place of a commercial station, where broadcasting could be done for hire, in the business and social conditions of the day.

"That experimental station has been very successful in transmitting music and entertainment which would be acceptable to listeners and it has also been successful in furnishing a medium through which business men could make friends for their businesses by assisting in the entertainment of the public.

"The further the experiment was carried the more evident it became that while the technical principle was similar to that of a telephone system, the objective of a broadcasting station was quite different from that of a telephone system. Consequently, it has seemed to us after several years of experimentation, that the broadcasting station which we built up might be more suitably operated by other interests.

"If WEAF has helped to point the way to that future it has served a useful purpose. In the hands of the Radio Corporation of America with a concurrent experience in radio broadcasting, the future of the station WEAF should be assured.

"It is generally recognized that there is a great future for radio broadcasting and that it has an important and permanent place in our national life.

"This is evidenced, if evidence were needed, by the fact that there are 536 broadcasting stations now in operation and that there are some 600 applications for new stations."

The following statement was issued by the R. C. A.:

"It is true that the Radio Corporation of America has acquired WEAF from the American Telephone and Telegraph Company, effective by the end of this year. We did this because the business of the Radio Corporation and its growth depend largely upon not only the maintenance but the constant development of the highest class of broadcasting programs. It is not too much to say that the staffs of WEAF and that of WJZ have both been highly successful in furnishing attractive programs.

"This purchase will enable us to give to the public the benefit of the joint efforts and experience as well as the technical research of these two great organizations. There is no intention of submerging the identity of either station in that of the other nor of making any violent change in their policies. We hope to make WJZ and WEAF the two most efficient stations of the 22 that are now operated in the metropolitan zone, and of the 537 throughout the entire United States. We have the same interest in trying to see that every part of our country is as adequately supplied with broadcasting of high quality as the metropolitan district in the vicinity of New York. We shall encourage cooperation with other stations and exchange of programs that will tend to give better broadcasting to the people of the United States. Our prime interest and our only interest is to see that broadcasting throughout the length and breadth of our great land is made so good that no home can afford to be without a radio receiving set."

* * *

Secretary of Commerce Herbert Hoover and his aids refuse to comment publicly on the sale of WEAF. They say it is a matter entirely beyond their jurisdiction. Chief Radio Supervisor W. D. Terrell said they had no more right to stop the sale than to stop trading in bread and meat in the local shops.

Some Pin Faith On Wired Wireless

Development of wired wireless is said to be behind the decision of the American Telephone & Telegraph Co. to quit the radio field, except for connecting stations by wire for chain broadcasting.

While no official announcement was made, a man who has been in close touch with the wired wireless experiments, and who recently attended a very successful demonstration, says that the R. C. A. is enthusiastic over it, as is the telephone company as well, because the interests of both unite to a degree.

The telephone company, it is said, would like to sell the public the idea of having a little box installed in each home where there is a telephone, so that the output of the box could be attached to a speaker. Although only one station could be heard,

the operation would be simple, since there would be no need of a radio receiver. All one would do would be to plug the speaker into the reception box, which is bringing in by telephone the program from the station.

The R. C. A. has an enormous financial interest in the sale of receivers, and wired wireless might not tend to incite receiver sales, some remarked, but an answer to this was that public desire for variety would safeguard the sale of receivers, and their homes would be equipped both with receivers and wired wireless, the preference being given to wired wireless only when the particular station that was sending over the telephone wire was desired to be heard.

The subject is attracting interest.

A THOUGHT FOR THE WEEK

WOULD it be quite correct and would it reflect the mind of the public if we were to say of broadcasting stations: "The more, -the merrier."

RADIO WORLD

REG. U.S. PAT. OFF.

Radio World's Slogan: "A radio set for every home."

TELEPHONE BRYANT 0558, 0559 PUBLISHED EVERY WEDNESDAY

FROM PUBLICATION OFFICE HENNESSY RADIO PUBLICATION CORPORATION 145 WEST 45th STREET, NEW YORK, N. Y.

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AUGUST 7, 1926

Slow Haste Best

THE wavelength muddle has reached the stage where fans are asked not to tune in stations that have adopted a wavelength or power other than that assigned by the Department of Commerce. This invitation to strike is a rather violent reaction, and there seems little likelihood that the fans will follow the suggestion.

Whether stations are morally justified in making any change is subject to debate, but they were legally justified. Some confusion resulted, although nothing even approximating chaos. Moreover, most of the stations were extremely careful to select a wavelength that would not increase interference difficulties.

Only as a last resort did the stations make the wavelength change. They grasped an opportunity they had been waiting for, because their assignment to very low wavelengths precluded reception by a large percentage of sets that do not tune down that low. Stations trying to sell time on the air therefore found a way to provide a convincing argument for prospective clients who had been strongly negatively biased previously.

On the moral score, it is certain that no general good can emerge from the wave shifting, although some special stations are benefited. The wiser policy would be to wait until Congress acts.

Tim Turkey Tells 'Em French Debt Solution

"Mellon Can't Expect to Collect a Red Nickel from a Nation That Sends More Code Than Programs"— "The Minister of Commerce Is Maurice Bokonowski, a Funny Way of Translating Hoover."

By Tim Turkey

THE trouble with France is: "Not enough radio." If the French would only ignore everything except getting DX, improving tone quality and experimenting with different negative grid voltages, they wouldn't have any time to think about debt evasion, and would pay up automatically.



TIM TURKEY

Here in America we do things differently. If we borrow any money from a foreign government, we fix the time when we are to pay back. On the night before due date the secretary to the Secretary of the Treasury calls up his chief and reminds him of the debt due on the morrow. And the secretary says: "I was just listening to a great concert from KFKX on that 2-tube reflex. Pretty good DX, eh what? Your phone call interrupted my fun. I hope I don't lose the station. Fading was pretty bad earlier in the evening, but the station's coming in fine now. I expect to be up until about 3 a. m., DX hunting, so I won't be down at the office until around noon. So when the Mesopotamian Minister of Plenipotentiary comes around for the money we owe him, give it to him, and find out what kind of a tube he's using in the detector stage that gives him such fine results."

The French haven't enough stations. In fact, they do not go to radio as we do, all through the works. We started with sets. Everybody built or bought sets, even kids, before there were hardly any stations. Then a lot of wise financiers and corporate executives got their fattened heads together and decided that it was a shame to let so many sets go begging for stations, so they started to put up stations. Now what do we find? There are 600 applicants for station licenses and only 500 prospective purchasers of new sets. It's up to the people to buy more sets, because the people must not let the corporate interests get ahead of them.

If France only showed that spirit the debt problem would never come up in the Chamber, because the Chamberians would be too busy with their sets to bother about avoiding paying what their country owes us. Secretary Mellon can't expect to collect a red nickel from a nation that sends more code than programs.

Political speechmaking can last only so long as broadcasting the speeches isn't permitted. Put those patriotic words on the air and somehow the sincerity behind them doesn't ring true. Let the French

Republic order all Chamber and also Star Chamber proceedings broadcast, and they'll be turning out Governments at the rate of 2-a-day, like political vaudeville, instead of only one in every two days.

I see that Raymond Poincare, a gentleman I never had the pleasure of meeting when I was a buck private in France, is the new Premier and Minister of Finance. My advice to him, if he wants to restore the franc to its prewar respect, is to invest some government money in spare parts and start a few subsidized gyp stores on the Boulevard des Italians. Any indictment on the basis of getting money under false pretenses could be nonplussed with the defense that the prosecution and the defendant are the same person.

Aristide Briand is Foreign Secretary. His first job should be to distribute free sets to the we-won't-pay-the-debt crowd, so they can tune in American stations, and have at least one pleasant reminder of our nation's existence.

The Minister of War is Paul Painleve. There isn't any war, so I can't see he'll have much to do, unless it is within his province to prevent war. In that case he would be a Minister of Peace. This is a ministry entirely too lofty and sensible for any nation to adopt in this fifth year of our broadcasting.

George Leygues is the Minister of Marine. He has charge of the department administering that great body of the credulous to whom the story of the rigors of debt payments should be broadcast.

Edouard Herriot, as Minister of Public Instruction, should teach the public to demand broadcast American jazz as an antidote for ill-feeling and the decamping of hissed tourists.

The Minister of Commerce is Maurice Bokonowski. A funny way the French have of translating Hoover.

My advice to Maurice Hoover is that he'd better get the Chamber of Deputies, the Deputy Chamberlain and the Chambered Nautilus, if need be, to pass a law giving him authority to assign wavelengths, time on the air and power to broadcasting stations, for if he doesn't, he'll be in the same boat as our own Herbert Bokonowski, in a few months.

But what French Minister expects to hold his post that long?

BARCUS WORKS ON RED CROSS

In addition to his duties as WEAF's Artists' Service Bureau Representative, Nathaniel Barcus, of Newark, N. J., also finds time to act as Associate Field Director of the American Red Cross of the Newark area. Barcus was one of the first to respond to the call for aid which was sent out from the army and navy arsenals located near Dover, N. J., at the time of the explosion on Saturday, July 10.

WPG USING 5,000 WATTS, SAME WAVE

Increase Made from 500 Watts — Director Says Stations Taking New Waves Threaten Good-Will on Which Broadcasting Solely Depends

FREQUENCY STEADY

Hope Expressed That No Other Station Will Light On Atlantic City Wave of 299.8 Meters

ATLANTIC CITY

WPG, the Municipal station here, is using 5,000 watts, or ten times its former power. This follows overtures made to the Department of Commerce last October. The wavelength, 299.8 meters, remains unchanged.

Edwin M. Spence, station director, said: "WPG has no intention of selecting or taking any other station's allotted wave, and it is hoped that other stations will not select the wave used by WPG.

"The increase in power by WPG has no connection with the present condition of radio broadcasting, due to the failure of Congress to enact legislation controlling the situation, as the city authorities of Atlantic City have been working on the installation of the new transmitter and increased power for the past year.

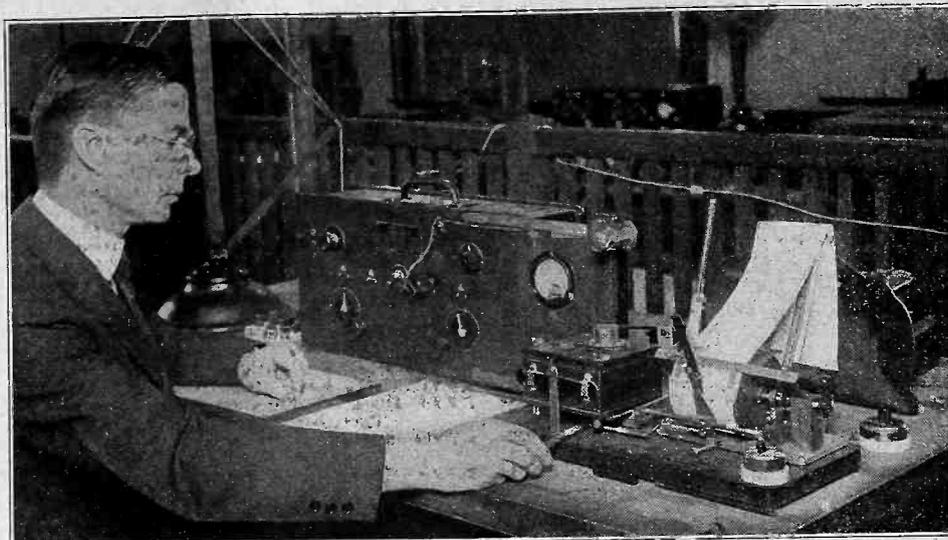
"Radio broadcasting depends entirely on the listener and the goodwill of the radio audience, and any station interfering with the transmission of programs from other stations surely will not have the goodwill of the radio public upon which broadcasting absolutely depends. Therefore, WPG with its new equipment is able to maintain its frequency and stay on its wavelength without deviating the fraction of a point."

Soprano at Home Finds Blending Tenor

Virginia Flohri and Robert Hurd have combined their talents to form one of the most popular acts of Pacific broadcasting. Miss Flohri, who has created an enthusiastic audience during her past three years singing from KFI, and Mr. Hurd, a recent addition to Coast musical circles, discovered, during an impromptu recital in Miss Flohri's home that their voices, soprano and tenor, blended unusually well. The KFI audience, after the first duet recital, responded so heartily that a series of duets was commenced. KFI says:

"It is only rarely that two artists of real merit will submerge their personalities enough to sing duets well, most duets being presented by people whose voices are not of sufficient quality to stand alone. Therefore, the work of Miss Flohri and Mr. Hurd, both noted soloists, takes on an added interest."

STANDARDS BUREAU TESTS FADING



(Harris & Ewing)

THOS. G. PARKINSON, of the Bureau of Standards, making tests with a portable fading recorder—an aid in analyzing the actual causes of fading. Fading, as stated by officials of one of the largest broadcasting companies, is one of the greatest obstacles to good broadcast reception.

Bureau to Exhibit A Piezo Oscillator

WASHINGTON.

The piezo oscillator (often called crystal oscillator), used in the control of the frequency or wavelength of radio transmitting stations, will be one of the exhibits of the Bureau of Standards display at the Sesqui-centennial Exposition. A model of a standard frequency meter in which this method of control is employed will also form a part of the exhibit.

The ability of the piezo oscillator to control the wavelength of radio transmitting stations lies in the fact that a plate cut from a natural quartz crystal has the property of oscillating at certain fixed

radio frequencies. The quartz plate is included in a radio frequency generating circuit making the complete piezo oscillator. Quartz is very durable and permanent material, and the frequency which it produces is very constant.

The piezo circuit may be an integral part of the transmitting circuit of a radio station, in which case the frequency of the station is automatically maintained, or it may be a separate piece of equipment. The Bureau of Standards has tested the last named application of the piezo oscillator in broadcasting stations, and these tests indicate that its use in most cases is simple and practical.

Kent Turned Hobby Into His Life Work

The magnetic batteries belonging to his father, a physician, first made electricity fascinating to A. Atwater Kent, according to a writer in "The Youth's Companion."

Kent made a life work out of a hobby. "He didn't choose a profession: he just kept his boyhood playthings and finally made a gigantic business out of them."

His love of things electrical resulted in his study of electrical engineering at Worcester Polytechnic Institute, his later employment in a motor factory, and his employment as salesman for an electrical house.

The factory that developed from one small room to the building now covering more than fifteen acres and which "without sprinting or hurrying" turns out a radio set or a speaker every two seconds started as follows:

"In his first 'factory,' which was a second floor room in Philadelphia, Kent manufactured the small telephones that are used in talking from one part of a building to another. In three years his business quadrupled, and he moved into a 'six-room factory.' And there he was—having proved himself in engineering, in

manufacturing and in selling—when the automobile began to be an expensive new toy. So he made automobile timers and ignition systems. Ten years after he started in business for himself he moved into a new plant where he had 125 men working for him. There he made automobile lighting systems as well.

"One day he discovered that his factory had received an order for 10,000 head-phones and for almost equal quantities of other gadgets used in this new radio toy.

"When the radio storm first broke, Kent left his desk one day and went downtown and bought a mass of parts. Then he called one of his best men, and the two of them began to master this new art—just as millions of boys were doing—by trying. In the attic of the Kent home they tinkered for months longer. In 1922, Kent began making parts, but it was 1923 before he had designed a set he thought good enough and had organized his plant to manufacture it.

"In 1924, he moved again—this time to a new plant in Germantown which covered more than eight acres, and which has almost doubled in size since."

OFFICIAL LIST OF STATIONS

(Corrected and Revised Up to
July 28)

Station	Owner and Location	Meters	Station	Owner and Location	Meters
KDKA	Westinghouse Co., Pittsburgh	309	WABO	Lake Ave. Bapt. Ch., Rochester, N.Y.	278
KDLR	Radio Elec. Co., Devils Lake, N. D.	231	WABQ	Haverford College Radio Club, Haverford, Pa.	261
KDYL	Newhouse Hotel, Salt Lake City, Utah	246	WABR	Scott High School, Toledo, O.	263
KFAB	Nebraska Buick Auto Co., Lincoln	340	WABW	College of Wooster, Wooster, O.	207
KFAD	Electrical Equip. Co., Phoenix, Ariz.	273	WABX	H. B. Joy, Mt. Clemens, Mich.	246
KFAF	A. E. Fowler, San Jose, Calif.	217	WABY	John Magaldi, Philadelphia, Pa.	242
KFAU	Ind. Scoohl Dist., Boise, Idaho	280	WABZ	Coliseum Place Baptist Church, New Orleans, La.	275
KFBB	F. A. Buttry Co., Havre, Mont.	275	WADC	Allen T. Simmons, Akron, O.	258
KFBC	W. K. Azbill, San Diego, Cal.	216	WAFD	A. B. Parfet Co., Port Huron, Mich.	275
KFBK	Kimball Upson Co., Sacramento, Cal.	248	WAHG	Grebe Co., Richmond Hill, N. Y.	316
KFBL	Leese Bros., Everett, Wash.	224	WAGM	R. L. Miller, Royal Oak, Mich.	225
KFBS	School District No. 1, Trinidad, Col.	238	WAIT	A. H. Waite & Co., Taunton, Mass.	229
KFBU	Bishop N. S. Thomas, Laramie, Wyo.	270	WAIU	American Ins. Union, Columbus, O.	294
KFCB	Nielson Radio Co., Phoenix, Ariz.	238	WAMD	Radisson Co., Minneapolis, Minn.	297
KFDD	St. Michael's Cathedral, Boise, Idaho	278	WAPI	Alabama Polytechnic, Auburn, Ala.	248
KFDM	Magnolia Petroleum Co., Beaumont, Texas	316	WARC	American Radio Res. Corp., Medford Hillside, Mass.	261
KFDX	1st Baptist Church, Shreveport, La.	250	WATT	Edison Co. (Portable), Mass.	244
KFDY	State College of Agriculture, Brookings, S. D.	273	WBAA	Purdue University, West Lafayette, Ind.	273
KFDZ	H. O. Iberson, Minneapolis, Minn.	231	WBAK	State Police, Harrisburg, Pa.	276
KFEC	Meier & Frank Co., Portland, Ore.	248	WBAL	Gas and Elec. Co., Baltimore, Md.	246
KFEL	Winner Radio Corp., Denver, Colo.	254	WBAO	James Millikia University, Decatur, Ill.	270
KFEQ	J. L. Scroggin, Oak, Neb.	268	WBAP	Star Telegram, Fort Worth, Tex.	476
KFEY	Bunker Hill & Sullivan, Kellogg, Idaho	233	WBAW	1st Baptist Church, Nashville, Tenn.	236
KFFP	1st Baptist Church, Moberly, Mo.	242	WBAX	J. H. Stenger, Jr., Wilkes-Barre, Pa.	256
KFGQ	Crazy Co., Boone, Iowa	226	WBBL	Grace Covenant Presbyterian Church, Richmond, Va.	229
KFH	Hotel Lassen, Wichita, Kans.	268	WBBM	Atlas Investment Co., Chicago, Ill.	226
KFHA	Western State College, Gunnison, Colo.	252	WBBP	High School, Petoskey, Mich.	238
KFHL	Penn College, Oskaloosa, Iowa	240	WBBR	Peoples Pulpit Ass., S. Is., N. Y.	416
KFI	E. C. Anthony Inc., Los Angeles, Cal.	469	WBBS	1st Baptist Church, New Orleans, La.	252
KFIF	Benson Institute, Portland, Ore.	248	WBBW	Ruffner City, Norfolk, Va.	222
KFIO	North Central H. S., Spokane, Wash.	266	WBBY	Washington Light Infantry, Charleston, S. C.	268
KFIQ	1st Methodist Church, Yakima, Wash.	256	WBBZ	C. L. Carrell, (Portable), Chicago, Ill.	218
KFIU	Alaska Elec. Co., Juneau, Alaska	226	WBCN	Foster McConnell, Chicago, Ill.	266
KFIZ	Daily Commonwealth, Fond du Lac, Wis.	273	WBDC	Baxter Co., Grand Rapids, Mich.	256
KFJB	Marshall Elec. Co., Marshalltown, Ia.	248	WBES	Bliss Electrical School, Takoma Park, Mich.	222
KFJC	R. B. Fegan, Junction City, Kan.	219	WBOQ	Grebe & Co., Richmond Hill, N. Y.	236
KFJF	National Radio Co., Oklahoma City, Okla.	261	WBNY	Miss S. Katz, N. Y. C.	322
KFJI	Liberty Theatre, Astoria, Ore.	246	WBRC	Bell Radio Corp., Birmingham, Ala.	248
KFJM	University of N. D., Grand Forks	278	WBRE	Baltimore Radio Ex., Wilkes-Barre, Pa.	231
KFJR	Ashley C. Dixon & Son, Portland, Ore.	263	WBT	Commerce Chamber, Charlotte, N. C.	275
KFJY	Tunwall Radio Co., Ft. Dodge, Iowa	246	WBZ	Westinghouse Co., Springfield, Mass.	333
KFJZ	W. E. Branch, Fort Worth, Tex.	254	WBZA	Westinghouse Electric and Mfg. Co., Boston, Mass.	242
KFKA	State Teachers College, Greeley, Colo.	273	WCAC	Agricultural College, Mansfield, Conn.	275
KFKU	University of Kansas, Lawrence, Kans.	275	WCAD	St. Lawrence University, Canton, N. Y.	263
KFKX	Westinghouse Co., Hastings, Neb.	238	WCAE	Kaufman & Baer, Pittsburgh, Pa.	461
KFKZ	Chamber of Commerce, Kirksville, Mo.	226	WCAJ	Nebraska Wesleyan University, University Place, Neb.	254
KFLR	University of N. M., Albuquerque, N. M.	254	WCAL	St. Olaf College, Northfield, Minn.	337
KFLU	San Benito Radio Club, San Benito, Tex.	236	WCAM	Galvin Radio Supply Co., Camden, N. J.	236
KFLV	Swedish Evangelist Church, Rockford, Ill.	229	WCAO	Brager of Baltimore, Baltimore, Md.	275
KFLX	George R. Clough, Galveston, Texas	240	WCAP	C. & P. Tel. Co., Washington, D. C.	469
KFLZ	Atlantic Auto Co., Anntia, Ia.	273	WCAR	Southern Radio Corp., San Antonio, Texas	263
KFMR	Morningside College, Sioux City, Iowa	261	WCAT	School of Mines, Rapids City, S. D.	240
KFMW	M. G. Sataren, Houghton, Mich.	263	WCAU	Universal Broadcasting Co., Philadelphia, Pa.	278
KFMX	Carleton College, Northfield, Minn.	337	WCAX	University of Vermont, Burlington, Vt.	250
KFNF	H. Field Seed Co., Shenandoah, Iowa	263	WCBA	C. W. Heinbach, Allentown, Pa.	254
KFOA	Rhodes Company, Seattle, Wash.	454	WCBD	W. G. Voliva, Zion, Ill.	345
KFOB	KFOB Inc., Burlingame, Cal.	226	WCBE	Uhalt Radio Co., New Orleans, La.	263
KFON	Echophone Shop, Long Beach, Cal.	233	WCBH	University of Mississippi, Oxford, Miss.	242
KFOO	Latter Day Saints University, Salt Lake City, Utah	236	WCMA	Culver Military Academy, Culver, Ind.	222
KFOR	David City Co., David City, Neb.	226	WCMB	Hotel Chapeau, Baltimore, Md.	229
KFOT	College Hill Radio Club, Wichita, Kan.	231	WCBR	C. H. Messter (Portable), R. I.	210
KFOX	Technical High School, Omaha, Neb.	248	WCBQ	1st Baptist Church, Nashville, Tenn.	236
KFOY	Beacon Radio Service, St. Paul, Minn.	252	WCCO	Gold Medal Station, Minneapolis, St. Paul, Minn.	416
KFPL	C. C. Baxter, Dublin, Texas	252	WCK	Stix Baer & Fuller Co., St. Louis, Mo.	273
KFPM	New Furniture Co., Greenville, Texas	242	WCLO	C. E. Whitmore, Camp Lake, Wis.	231
KFPR	Forestry Department, Los Angeles, Cal.	231	WCLS	H. M. Church, Joliet, Ill.	214
KFPW	St. John's Church, Cartersville, Mo.	258	WCOA	Municipal Station, Pensacola, Fla.	222
KFPY	Symonds Invest. Co., Spokane, Wash.	266	WCSH	Henry P. Rines, Portland, Me.	256
KFQA	The Principia, St. Louis, Mo.	261	WCSO	Wittenberg College, Springfield, Ohio.	248
KFQB	Searchlight Pub. Co., Ft. Worth, Tex.	263	WCWS	C. W. Selen, Providence, R. I.	210
KFQD	Chovin Co., Anchorage, Alaska	227	WCX	Detroit Free Press & Jewett Radio and	
KFQP	G. S. Carson, Jr., Iowa City, Ia.	224	WDZ	J. L. Bush, Tuscola, Ill.	278
KFQU	W. C. Riker, Holy City, Cal.	217	WDAD	Dod's Auto Accessories, Inc., Nashville, Tenn.	226
KFQW	F. C. Knierim, North Bend, Wash.	216	WDAE	Tampa Daily News, Tampa, Fla.	273
KFQZ	Taft Products Co., Hollywood, Cal.	226	WDAF	Kansas City Star, Kansas City, Mo.	366
KFRB	Hall Bros., Beeville, Texas	248	WDAG	J. L. Martin, Amarillo, Tex.	263
KFRD	City of Paris, San Francisco, Cal.	268	WDAH	Trinity Metr. Church, El Paso, Tex.	268
KFRU	Stephens College, Columbia, Mo.	500	WDAY	Radio Equipment Corp., Fargo, N. D.	261
KFRW	G. and G. Radio and Electric Shop, Olympia, Wash.	219	WDBE	Gilham-Scohen Elec., Atlanta, Ga.	278
KFSD	African Radio Corporation, San Diego, Cal.	246	WBDJ	Richardson Wayland, Roanoke, Va.	229
KFSG	Echo Park Evang. Assn., Los Angeles	275	WDBK	M. F. Broz, Furn, Cleveland, O.	227
KFUL	T. Googan & Bro., Galveston, Tex.	258	WDBO	Rollins College, Winter Park, Fla.	240
KFUM	W. D. Corley, Colorado Springs, Col.	240	WDBZ	Boy Scouts of Amer., Kingston, N.Y.	233
KFUO	Concordia Theo. Seminary, St. Louis, Mo.	545	WDCH	Dartmouth College, Hanover, N. H.	250
KFUP	Fitzsimmons Gen. Hospital, Denver	234	WDGY	Dr. G. W. Young, Minneapolis, Minn.	263
KFUR	Peery Building Co., Ogden, Utah	224	WDND	Dod's Auto Accessories, Inc., 160-164 8th Ave., N., Nashville, Tenn.	226
KFUS	Louis L. Sherman, Oakland, Cal.	256	WDOD	Chatt. Radio Co., Chattanooga, Tenn.	256
KFUT	Univ. of Utah, Salt Lake City, Utah	261	WDZ	J. L. Bush, Tuscola, Ill.	278
KFUU	Colburn & Mathewson, Oakland, Cal.	220	WDRC	Doolittle Radio, New Haven, Conn.	268
KFVD	C. & W. J. McWhinnie, San Pedro, Cal.	205	WDFW	Dutec Wilcox Flint, Cranston, R. I.	441
KFVE	Film Corp., St. Louis, Mo.	240	WEAF	Broadcasting Company of America, N. Y. City, N. Y.	492
KFVG	1st Meth-Epis. Church, Independence, Kan.	236	WEAI	Cornell University, Ithaca, N. Y.	254
KFVI	56th Cav. Brigade, Houston, Tex.	240	WEAM	Borough of North Plainfield, N. Plainfield, N. J.	271
KFVN	C. E. Bagley, Welcome, Minn.	227	WEAN	Shepard Co., Providence, R. I.	260
KFVS	Cape Girardeau Battery Station, Cape Girardeau, Mo.	224	WEAO	Ohio State University, Columbus, O.	294
			WEAR	Willard Storage Battery Co., Cleveland, O.	390
			WEAU	Davidson Bros. Co., Sioux City, Ia.	275
			WEBC	W. C. Bridges, Superior, Wis.	242
			WEBD	Elec. Equipment & Service Co., Anderson, Ind.	246

Station	Owner and Location	Meters
WEBH	Edgewater Beach Hotel, Chicago, Ill.	370
WEBJ	Third Avenue R. R. Co., New York, N. Y.	273
WEBL	Radio Corp. of Ama. (Portable)	226
WEBO	Tate Radio Co., Harrisburg, Ill.	226
WEBR	H. H. Howell, Buffalo, N. Y.	244
WEBW	Beloit College, Beloit, Wisc.	268
WEBZ	Savannah Radio Corp., Savannah, Ga.	263
WEEL	Edison Co., Boston, Mass.	349
WEHS	Robert E. Hughes, Evanston, Ill.	203
WEMC	Emm. Missionary College, Merrien Springs, Mich.	286
WENR	All-Amer. Radio Corp., Chicago, Ill.	266
WEW	St. Louis University, St. Louis, Mo.	248
WFAA	Dallas News & Journal, Dallas, Tex.	476
WFAM	The Times, St. Cloud, Minn.	273
WFAP	University of Nebr., Lincoln, Nebr.	275
WFBC	1st Baptist Church, Knoxville, Tenn.	250
WFBE	J. V. De Walle, Seymour, Ind.	226
WFBG	W. F. Gable Co., Altoona, Pa.	278
WFBJ	Galvin Radio Supply Co., Camden N. J.	236
WFBJ	St. Johns University, Collegeville, Minn.	236
WFBL	Onondaga Hotel, Syracuse, N. Y.	252
WFBM	Merchants Lighting Co., Indianapolis, Ind.	268
WFBR	Maryland National Guard, Baltimore, Md.	254
WFCL	Chicago Fed. of Labor, Chicago, Ill.	492
WFBZ	Knox College, Galesburg, Ill.	254
WFDL	F. D. Fallain, Flint, Mich.	234
WFI	Strawbridge & Clothier, Philadelphia, Pa.	395
WFKB	F. K. Bridgman, Chicago, Ill.	217
WFLR	R. M. Lacey, Brooklyn, N. Y.	205
WGAL	Lancaster Elec. Supply Co., Lancaster, Pa.	248
WGBB	H. H. Carman, Freeport, N. Y.	244
WGBG	1st Baptist Church, Memphis, Tenn.	278
WGBF	The Finke Furniture Co., Evansville, Ind.	236
WGBI	Scranton Broadcasters, Inc., Scranton, Pa.	240
WGBR	Marshfield Broadcasting Association, Marshfield, Wis.	229
WGBS	Gimbel Brothers, New York, N. Y.	316
WGBU	Florida Cities Finance Co., Fulford By-the-Sea, Fla.	278
WGBX	University of Maine, Orono, Maine.	234
WGES	Oak Leaves Broadcasting Station, Oak Park, Ill.	250
WGHB	G. H. Boules, Developments, Clear water, Fla.	266
WGN	The Tribune, Chicago, Ill.	303
WGMU	A. H. Grebe & Co., Inc., Richmond Hill, N. Y.	236
WGCP	Grand Central Palace, N. Y. City	252
WGHB	G. H. Boules, Clearwater, Fla.	266
WGHP	G. H. Phelps, Inc., Detroit, Mich.	270
WGMU	Grebe & Co., Richmond Hill, N. Y.	236
WGR	Federal Tel. Mfg. Co., Buffalo, N. Y.	319
WGST	Ga. School of Tech., Atlanta, Ga.	270
WGY	General Elec. Co., Schenectady, N. Y.	380
WHA	University of Wisconsin, Madison, Wis.	535
WHAD	Marquette Univ., Milwaukee, Wis.	275
WHAM	Eastman Sch. Music, Rochester, N. Y.	278
WHAP	Taylor Finance Corp., N. Y. C.	431
WHAR	Cook's Sons, Atlantic City, N. J.	275
WHAS	The Courier Journal-Times, Louisville, Ky.	400
WHAV	Wilmington Elec., Wilmington, Del.	266
WHAZ	Rensselaer Institute, Troy, N. Y.	280
WHB	Sweeney School Co., Kansas City, Mo.	250
WHBA	Shaffer Music House, Oil City, Pa.	250
WHBC	Rev. E. P. Graham, Canton, Ohio.	254
WHBD	C. W. Howard, Bellefontaine, Ohio.	222
WHBF	Beardsley Co., Rock Island, Ill.	222
WHBG	John S. Skane, Harrisburg, Pa.	231
WHEC	Hickson Elec. Co., Rochestr., N. Y.	258
WHBJ	Laver Auto Co., Ft. Wayne, Ind.	234
WHBL	C. L. Carroll (Portable), Ill.	216
WHBM	C. L. Carroll (Portable), Chicago.	233
WHBN	1st Ave. Methodist Church, St. Petersburg, Fla.	238
WHBP	Johnstown Auto Co., Johnstown, Pa.	256
WHBR	Scientific E. & M. Co., Cincinnati, O.	216
WHBQ	St. Johns Meth. Church, Memphis, Tenn.	233
WHBU	B. L. Bing's Sons, Anderson, Ind.	219
WHBY	St. Norbit's College, De Pere, Wis.	250
WHBW	D. R. Kienzle, Philadelphia, Pa.	216
WHDI	Wm. Hood Dunwoody Ind. Inst., Minneapolis, Minn.	278
WHEC	Hickson Elec. Co., Rochester, N. Y.	258
WHN	George Schubel, New York, N. Y.	361
WHK	Radio Air Service Corp., Cleveland, Ohio	273
WHO	Bankers Life Co., Des Moines, Ia.	526
WHT	Radiophone Broadcasting Corp., Derrfield, Ill.	400
WIAD	H. R. Miller, Philadelphia, Pa.	250
WIAS	Home Electric Co., Burlington, Ia.	254
WIBA	Capital Times, Madison, Wis.	236
WIBG	St. Paul's E. P. Church, Elkins Park, Pa.	222
WIBH	Elite Radio, New Bedford, Mass.	210
WIBI	Frederick B. Gittell, Flushing, N. Y.	219
WIBJ	C. L. Carrell, Chicago, (Portable)	216
WIBO	Nelson Bros., Chicago, Ill.	226
WIBM	Billy Maine, Chicago, Ill.	216
WIBR	Thurman A. Owings, Weirton, W. Va.	246
WIBS	Lt. T. F. Hunt, Elizabeth, N. J.	203
WIBU	The Electric Farm, Poynette, Wis.	222
WIBW	Dr. L. L. Dill, Logansport, Ind.	220
WIBX	Grid-Leak, Inc., Utica, N. Y.	205
WIBZ	A. B. Trum, Montgomery, Ala.	231
WIL	Benson Radio Co., St. Louis, Mo.	273
WIOD	Carl S. Fisher Co., Miami, Fla.	248
WIP	Gimbel Brothers, Philadelphia, Pa.	508
WIAD	Jackson's Radio Elec. Co., Waco, Tex.	353
WJAC	Norfolk Daily News, Norfolk, Nebr.	270
WJAK	Kokomo Tribune Station, Kokomo, Ind.	254

Station	Owner and Location	Meters
WJAM	D. M. Perham, Cedar Rapids, Ia.	268
WJAR	The Outlet Co., Providence, R. I.	306
WJAS	Pittsburgh Radio Supply House, Pittsburgh, Pa.	275
WJAZ	Voice of Jacksonville, Fla.	337
WJAX	Zenith Radio Corp., Mt. Prospect, Ill.	322
WJBA	D. H. Lentz, Jr., Joliet, Ill.	207
WJBB	L. W. McClung, St. Petersburg, Fla.	254
WJBC	Hummer Furn. Co., La Salle, Ill.	234
WJBE	Financial Journal, St. Petersburg, Fla.	254
WJBI	R. S. Johnson, Red Bank, N. J.	219
WJBK	Ernest F. Goodwin, Ypsilanti, Mich.	233
WJBL	Gushard Dry Goods, Decatur, Ill.	270
WJBO	V. Jensen, New Orleans, La.	268
WJBR	Bucknell University, Lewisburgh, Pa.	211
WJBS	Omro Drug Store, Omro, Wis.	228
WJBT	J. S. Boyd, Chicago, Ill.	238
WJBU	Bucknell University, Lewisburgh, Pa.	212
WJJD	Order of Moose, Mooseheart, Ill.	370
WJR	Detroit Free Press and Jewett Radio and Phonograph Co., Pontiac, Mich.	517
WJY	Radio Corp. of Amer., N. Y. C.	405
WJZ	Radio Corp. of Amer., N. Y. C., Bound Brook, N. J.	455
WKAF	WKAF broadcasting Co., Milwaukee, Wis.	261
WKAQ	Radio Corp. of Porto Rico, San Juan, P. R.	341
WKAR	Mich. Agric. College, Lansing, Mich.	286
WKAF	WKAF Co., Milwaukee, Wis.	261
WKAV	Laconia Radio Club, Laconia, N. H.	224
WKBA	Arrow Batt. Co., Chicago	288
WKBB	Sanders Bros., Joliet, Ill.	214
WKBE	K. & B. Electric Co., Webster, Mass.	231
WKBC	C. L. Carrell, (Portable) Chicago, Ill.	216
WKRC	Kodel Radio Corp., Cincinnati, O.	326-422
WKY	Hill Richards, Oklahoma City, Ok.	275
WLAL	1st Presbyterian Church, Tulsa, Okla.	250
WLAP	W. V. Jordan, Louisville, Ky.	275
WLB	University of Minn., Minneapolis, Minn.	278
WLBL	Wisconsin Department of Markets, Stevens Point, Wis.	278
WLIB	Liberty-Weekly Inc., Elgin, Ill.	303
WLIT	Lit Brothers, Philadelphia, Pa.	395
WLS	Sears Roebuck Co., Chicago, Ill.	345
WLSI	Lincoln Studio Inc., Providence, R. I.	441
WLTS	Lane Technical H. S., Chicago	258
WLW	Crosley Radio Corp., Cincinnati, Ohio	422
WLWL	Missionary Society of St. Paul the Apostle, N. Y. City	288
WMAC	C. B. Meredith, Cazenovia, N. Y.	275
WMAF	Round Hills Radio Corp., Dartmouth, Mass.	441
WMAK	Norton Laboratory, Lockport, N. Y.	266
WMAL	Leese Optical Co., Washington, D. C.	213
WMAN	1st Baptist Church, Columbus, O.	278
WMAQ	Chicago Daily News, Chicago, Ill.	448
WMAY	Kings Highway Presbyterian Church, St. Louis, Mo.	248
WMAZ	Mercer University, Macon, Ga.	261
WMBB	Amer. Bond and Mort. Co., Chicago	250
WMBG	Mich. Broadcasting Co., Detroit	256
WMBF	Fleetwood Hotel, Miami Beach, Fla.	384
WMC	Commercial Appeal, Memphis, Tenn.	500
WMCA	Hotel McAlpin, N. Y. C., Hoboken	341
WMRJ	P. J. Prinz, Jamaica, N. Y.	227
WMSG	Madison Square Garden B'dstg Corp., N. Y. C.	303
WNAS	Shepard Stores, Boston, Mass.	250
WNAC	Shepard Stores, Boston, Mass.	280
WNAD	University of Okla., Norman, Okla.	254
WNAL	Omaha Central High School, Omaha, Nebr.	258
WNAT	Lenning Bros. Co., Philadelphia, Pa.	250
WNAX	Dakota Radio App. Co., Yankton, S. D.	244
WNBH	New Bedford Hotel, New Bedford, Mass.	248
WNJ	Radio Shop, Newark, N. J.	252
WNOX	Peoples Tel. & Tel. Co., Knoxville, Tenn.	268
WNYC	Municipal Station, New York, N. Y.	526
WOAI	Southeast Equip. Co., San Antonio, Tex.	395
WOAN	Vaughan Con. of Music, Lawrenceburg, Tenn.	283
WOAW	Woodmen of the World, Omaha, Nebr.	526
WOAX	F. J. Wolff, Trenton, N. J.	240
WOC	Palmer School of Chiro, Davenport, Ia.	484
WOCL	Hotel Jamestown, Jamestown, N. Y.	275
WODA	O'Dea Radio, Paterson, N. J.	224
WOI	Iowa State College, Ames, Iowa	270
WOK	Neutrowound Radio Mfg. Co., Homewood, Ill.	217
WOKO	Earl B. Smith, Patterson, N. J.	233
WOO	John Wanamaker, Philadelphia, Pa.	508
WOOD	Grand Rapids Radio Co., Grand Rapids, Mich.	242

Station	Owner and Location	Meters
WOQ	Unity School of Christianity, Kansas City, Mo.	478
WOR	L. Bamberger & Co., Newark, N. J.	405
WORD	Peoples Pulpit Assn., Batavia, Ill.	275
WOS	State Market Bur., Jefferson City, Mo.	441
WOWO	Main Auto, Ft. Wayne, Ind.	227
WPAK	N. D. Agricultural College, Agricultural College, N. D.	275
WPCC	N. Shore Congre. Church, Chicago	258
WPDQ	H. L. Turner Buffalo, N. Y.	205
WPG	Municipality, Atlantic City, N. J.	300
WPRC	Wilson Radio, Harrisburg, Pa.	216
WPSC	Penn State College, State College, Pa.	261
WQAA	H. A. Beale, Jr., Parkersburg, Pa.	220
WQAC	Gish Radio Service, Amarillo, Tex.	234
WQAE	Moore Radio News Station, Springfield, Vermont	246
WQAM	Electric Equipment Co., Miami, Fla.	263
WQAN	Scranton Times, Scranton, Pa.	250
WQAO	Calvary Baptist Church, New York, N. Y.	360
WQJ	Calumet Rainbo Broadcasting Co., Chicago, Ill.	448
WRAF	Laporte Radio Club, Wash., D. C.	224
WRAC	Economy Light Co., Escanaba, Mich.	256
WRAM	Lombard College, Galesburg, Ill.	244
WRAV	Antioch College, Yellow Springs, O.	263
WRAW	Avenue Radio Shop, Reading, Pa.	238
WRAX	The Berachah Church of Philadelphia, Gloucester City, N. J.	280
WRBC	Immanuel Lutheran Church, Valparaiso, Ind.	278
WRC	Radio Corp. of America, Washington, D. C.	469
WRCO	Wynna Radio Co., Raleigh, N. C.	252
WREC	Wooten's Radio Shop, Cold Water, Miss.	254
WREO	Reo Motor Co., Lansing, Mich.	286
WRHF	Washington Radio Hospital Fund, Wash., D. C.	256
WRHM	Rosedale Hospital, Minneapolis, Minn.	252
WRK	Doron Bros., Elec. Co., Hamilton, O.	270
WRM	University of Illinois, Urbana, Ill.	273
WRMU	A. H. Grebe & Co., Inc., Motor Yacht Mu-I, N. Y. City	236
WRNY	Experimenter Pub. Co., N. Y. C.	375
WRR	City of Dallas, Tex.	246
WRST	Radiotol Mfg. Co., Inc., 5 First Ave. Bay Shore, N. Y.	216
WRVA	Laurus & Bros., Co., Richmond, Va.	256
WRW	Tarrytown Research Laboratory, Tarrytown, N. Y.	273
WSAI	U. S. Playing Card Co., Cincinnati, O.	326
WSAJ	Grove City College, Grove City, Pa.	229
WSAN	Allentown Call, Allentown, Pa.	229
WSAR	Doughty & Welch Elec. Co., Fall River, Mass.	254
WSAX	Zenith Radio Corp., Chicago, Ill.	268
WSAZ	Chase Electric Shop, Pomeroy, Ohio.	244
WSB	The Atlanta Journal, Atlanta, Ga.	428
WSBC	World Battery Co., Chicago, Ill.	210
WSBF	Stix Baer and Fuller, St. Louis, Mo.	273
WSBT	South Bend Tribune, South Bend, Ind.	275
WSDA	7th Day Adventist Church, N. Y. C.	263
WSKC	World's Star Knitting Co., Bay City, Mich.	261
WSM	National Life and Accident Ins., Nashville, Tenn.	283
WSBM	Saenger Amus. Co., New Orleans	319
WSMH	Shattick Music House, Owosso, Mich.	240
WSMK	S. M. K. Radio Corp., Dayton, O.	275
WSOE	School of Engineering, Milwaukee	246
WSRO	H. W. Fahlander, Hamilton, Ohio	251
WSSH	Tremont Temple Baptist Church, Ia.	484
WSUI	State University of Iowa, Iowa City, Ia.	219
WSVS	Seneca Vocational School, Buffalo, N. Y.	275
WSWS	S. W. Straus & Co., Woodale, Ill.	266
WTAB	Daily Herald, Fall River, Mass.	266
WTAD	R. E. Compton, Carthage, Ill.	236
WTAG	Telegram, Worcester, Mass.	545
WTAL	Toledo Radio & Elec. Co., Toledo, O.	252
WTAM	Wilard Storage Batt. Co., Cleveland	389
WTAP	Cambridge Radio Elec. Co., Cambridge, Ill.	242
WTAQ	S. Van Gordon & Son, Osseo, Wis.	254
WTAR	Reliance Radio Co., Norfolk, Va.	261
WTAW	Agricultural & Mech. College, College Station, Tex.	270
WTAX	Williams Hardware, Streator, Ill.	231
WTAZ	T. J. McGuire, Lambertville, N. J.	261
WTIC	Travelers Insur. Co., Hartford, Conn.	476
WUBO	V. Jansen, New Orleans, La.	268
WVAE	Electric Park, Plainfield, Ill.	242
WAO	Michigan College of Mines, Houghton, Mich.	263
WWGL	Radio Engineering Corp., Richmond Hill, N. Y.	213
WWI	Ford Motor Co., Dearborn, Mich.	266
WWJ	Detroit News, Detroit, Mich.	353
WWL	Loyola University, New Orleans, La.	275

WITH THE AMATEURS

HONOLULU, T. H.

Greetings from the high-school students of Hawaii to their fellow-students in the United States were recently extended in an amateur radiogram sent by the principal of the McKinley High School of this city to the headquarters offices of the American Radio Relay League, at Hartford, Conn. The message was started from the Hawaiian station 6CLJ, operated by Masayuki Hismato, of Honolulu, and received in this country by R. G.

Olson, of Tacoma, Washington, operator of amateur station 7AFO.

* * *

WASHINGTON.

A record for consistent operation of which any amateur might be proud is that held by Eppa W. Darno, of this city, whose short-wave station, 3BWT, has not missed being on the air in a single night in over five years. Mr. Darne, member of the American Radio Relay League, has communicated with hundreds of hams.

THE RADIO TRADE

Time Payments Increase Sales

Crosley Draws Parallel Between Automotive and Radio Fields—Deferred Financing Affects 75 Per Cent. of Cars

By Powel Crosley, Jr.

If we turn to the automobile field—and the growth of the radio industry presents a picture almost similar to the growth of the motor car industry—we find that the time-payment purchase of motor cars has been one of the greatest factors in the growth of the motor car industry. That it is almost universal in this field may be judged from the fact that it is estimated by reliable authorities that 75 per cent. of all motor cars are purchased in this manner.

But to get back to the economic part time payment has played in the motor car field. Since the time payment plan

went into effect the production of motor cars has increased ten-fold.

The time-payment plan makes for large production—large production makes for low costs. Low costs then make for greater sales. It is an economic cycle that has proved absolutely sound. That automobile prices are 29 per cent. below the pre-war level is mainly accounted for by the large production which the time-payment plan has made possible.

The same logic and the same reasoning apply equally well to the radio industry. Time-payment plans are part and parcel of our American system of merchandising. This system has been in operation long enough to prove its soundness.

Duco Makes Radio Debut

Duco finish, which has been used with great success heretofore in the automobile and furniture industries, has now entered the radio field, E. I. DuPont de Nemours & Co. announce. Because of the beauty of this finish and because of the saving in time effected through its quick drying properties, its use has been adopted by a number of radio cabinet makers. The hardness of this new finish protects the cabinet from the scars of daily usage in the home. It is also waterproof, and has great flexibility, which insures it against checking, cracking, or crazing with age or as a result of climatic changes.

THE BERNARD PORTABLE SUPER-HETERODYNE appeared in **RADIO WORLD** dated April 3, 10, 17 and 24. Sent on receipt of 60c, or start your subscription with April 3 issue. **RADIO WORLD**, 145 West 45th St., N. Y. City.

New Corporations

P. W. Mack, N. Y. City, radio, \$10,000; P. M. Mack, P. Saitler, L. Landau. (Attys., Goodspeed & Post, 522 5th Ave., N. Y. City).

Look Up Down, N. Y. City, radio, \$5,000; M. J. Benisch, A. V. Havens, C. W. Down. (Atty., J. J. Dooling, 36 West 44th St., N. Y. City).

Brooklyn Radio Co., Brooklyn, N. Y., \$100,000; B. and E. Ginsberg, E. Krasnoff. (Atty., S. J. Shapiro, 51 Chambers St., N. Y. City).

Commercial Broadcasting Corp., N. Y. City, 1,000 shares, \$100 each; 3,000 common, no par; W. E. Boughton, W. F. Faxt, R. E. O'Dea. (Atty., W. G. Morse, 43 Exchange Place, N. Y. City).

FRATERNIZING LEADINGS

Antenna wires so thickly populate the roofs of some apartment houses in large cities that no rain even touches the tin and no leadin ever fails to make brotherly contact with a fellow leadin. Let's start a Fraternal Order of Leadins.

OSCILLATION CONTROL



is easily accomplished through the use of **CLAROSTAT** connected in series with the plate leads of the R. F. tube.

American Mechanical Laboratories, Inc.
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CONFESSIONS OF A SUPER BUG, by James H. Carroll, appeared in **RADIO WORLD** dated May 22. 15c per copy, or start sub. with that number. **RADIO WORLD**, 145 W. 45th St., N. Y. C.

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS.

10 CENTS A WORD. 10 WORDS MINIMUM. CASH WITH ORDER.

PATENTS—Write for free Guide Books and "Record of Invention Blank" before disclosing inventions. Send model or sketch of your invention for our inspection and Instructions Free. Terms reasonable. Radio, Chemical, Mechanical Electrical and Trademark experts. Victor J. Evans Co., 924 Ninth, Washington, D. C.

CASH PAID FOR Dental Gold, False Teeth, Discarded Jewelry, Diamonds, Platinum. Mail. Florida Gold Refining Co., 21 Adams, Jacksonville, Fla.

RADIO SUMMER DISCOUNTS. Becker Radio Service, Seventh Street, Martins Ferry, Ohio.

MANAGER: LARGE JOBBER, handling several standard makes of Radio wishes to engage services of Manager of Radio Department. Write giving full details, salary expected, etc. Box 400, Radio World.

TABLE FOR CONVERSION OF FREQUENCIES AND METERS appeared in **RADIO WORLD** dated May 1, 1925. Sent on receipt of 15c, or start your sub. with that number. **RADIO WORLD**, 145 W. 45th St., N. Y. C.

HERMAN BERNARD, managing editor of **RADIO WORLD**, broadcasts every Friday at 7 p. m., from WGBS, Gimbel Bros., N. Y. City. 315.6 meters. He discusses "What's Your Radio Problem?" Listen in!

"LIBERTY AFLAME" and other verses, by Roland Burke Hennessy. Handsomely bound in cloth; sent postpaid for \$1.00. Guaranty Radio Goods Co., 145 West 45th Street, New York City.

BLUE PRINT FOR 1926 DIAMOND OF THE AIR sent on receipt of 50c. Guaranty Radio Goods Co., 145 West 45th Street, New York City.

A BUILT-IN SPEAKER SET, by Herbert E. Hayden, **POWERTONE IN OPERATION**, by Capt. P. V. O'Rourke, **THE NOVICE'S NOOK**, by James B. Scully, appeared in **RADIO WORLD** dated May 22. Sent on receipt of 15c, or start sub. with that number. **RADIO WORLD**, 145 W. 45th St., N. Y. C.

THE BRETWOOD GRID LEAK will aid you to get DX even in the summer. Sent on receipt of \$1.50. North American Bretwood Co., 145 W. 45th St., N. Y. C.

A DISCUSSION ON SELECTIVITY, by J. E. Anderson, appeared in **RADIO WORLD**, dated June 19. Sent on receipt of 15c, or start subscription with that number. **RADIO WORLD**, 145 W. 45th St., N. Y. C.

GETTING MAXIMUM RESULTS with Super-Heterodynes by Herman Bernard appeared in **RADIO WORLD** dated May 15th. 15c per copy, or start your subscription with that issue. **RADIO WORLD**, 145 West 45th St. N. Y. City.

SELL AND INSTALL RADIO SETS. With a \$25 capital we can put you in the radio business and show you how to earn a hundred or two a week. For full details write Guaranty Radio Goods Co., 145 West 45th Street, New York City.

THE VACATION NUMBER OF RADIO WORLD DATED JUNE 12 contained many great features. The light 5-tube Portable, by Herman Bernard, The Freshman Masterpiece, by Albert W. Franklin, The Importance of C Batteries, by John F. Rider, etc. Sent on receipt of 15c, or start sub. with that number. **RADIO WORLD**, 145 W. 45th St., N. Y. C.

TO KEEP YOUR FILES COMPLETE, you can order your newsdealer to put a copy aside for you each week while on your vacation. Or, send \$1.00 for **RADIO WORLD** from now until the end of August, and in this way you will not miss any copies. **SUBSCRIPTION DEPT.**, **RADIO WORLD**, 145 W. 45th St., N. Y. C.

THE NEW 1-DIAL POWERTONE SET, by Capt. P. V. O'Rourke, appeared in **RADIO WORLD** dated April 17. Sent on receipt of 15c, or start sub. with that number. **RADIO WORLD**, 145 W. 45th St., N. Y. C.

Female Help Wanted

WANTED—HOME WORKERS. Can earn \$4.25 cash or big premiums. Write for particulars. Household Supply Co., 715 Baltimore Bldg., Chicago, Ill.

List of Exhibitors At Show in Chicago

The 5th annual Chicago radio show will be held at the Coliseum, Chicago, October 11 to 17.

The exhibit space in the show is over 90% sold, and there remain available for sale, only 21 booth spaces.

The list of exhibitors follows:

- Able Tool & Engineering Company, Chicago, Ill.
- The A. C. Electrical Mfg. Company, Dayton, Ohio.
- Acme Apparatus Company, Cambridge, Mass.
- Acme Wire Company, New Haven, Conn.
- All-American Radio Corporation, Chicago, Ill.
- Aluminum Corporation of America, Pittsburg, Pa.
- American Bosch Magneto Corporation, Springfield, Mass.
- American Electric Company, Chicago, Ill.
- Amplion Corporation of America, New York City, N. Y.
- The Amrad Corporation, Medford Hillside, Mass.
- Amsco Products, Inc., New York City, N. Y.
- Apco Manufacturing Company, Providence, R. I.
- Apex Electric Mfg. Company, Chicago, Ill.
- Argus Radio Corporation, New York City, N. Y.
- Atwater Kent Manufacturing Company, Philadelphia, Pa.
- Auburn Button Works, Auburn, N. Y.
- Audiola Radio Company, Chicago, Ill.
- Bakelite Corporation, New York City, N. Y.
- Beacon Radio Manufacturing Co., Inc., Brooklyn, N. Y.
- Belden Manufacturing Company, Chicago, Ill.
- Benjamin Electric Mfg. Company, Chicago, Ill.
- Best Manufacturing Company, Newark, N. J.
- The Borkman Radio Corporation, Salt Lake City, Utah.
- Bosworth Electric Mfg. Company, Cincinnati, Ohio.
- L. S. Brach Mfg. Company, Newark, N. J.
- Bremer Tully Mfg. Company, Chicago, Ill.
- Buell Mfg. Company, Chicago, Ill.
- Cardwell Mfg. Company, Brooklyn, N. Y.
- Carter Radio Company, Chicago, Ill.
- Chelsea Radio Company, Chelsea, Mass.
- Corbett Manufacturing Company, St. Mary's, Pa.
- Cornish Wire Company, New York City, N. Y.
- Coyne Electrical School, Inc., Chicago, Ill.
- Crosley Radio Corporation, Cincinnati, Ohio.
- Crowe Name Plate & Mfg. Company, Chicago, Ill.
- E. T. Cunningham, Inc., San Francisco, Cal.
- Chicago Herald Examiner, Chicago, Ill.
- Dayton Fan & Motor Company, Dayton, Ohio.
- DeVeaux Radio Company, Defiance, Ohio.
- Diamond State Fibre Company, Bridgeport, Pa.
- Diamond T Radio Manufacturers, South Bend, Ind.
- Dictograph Products Corporation, New York City, N. Y.
- Dubilier Condenser & Radio Corporation, New York City, N. Y.
- Dudlo Manufacturing Corporation, Fort Wayne, Ind.
- Duratron Products Corporation, Union City, N. J.
- Electrical Research Laboratories, Chicago, Ill.
- Electric Storage Battery Company, Philadelphia, Pa.
- English-Whitman Products, Inc., New York City, N. Y.
- Etching Company of America, Chicago, Ill.
- Fanstel Products Company, North Chicago, Ill.
- Farrand Mfg. Company, Long Island City, N. Y.
- Federal Radio Corporation, Buffalo, N. Y.
- J. B. Ferguson, Inc., New York City, N. Y.
- Fett & Kimmell, Bluffton, Ohio.
- Formican Insulation Company, Cincinnati, Ohio.
- Forest Electric Company, Newark, N. J.
- Freed-Eisemann Radio Corporation, Brooklyn, N. Y.
- French Battery Company, Madison, Wis.
- Chas. Freshman Company, Inc., New York City, N. Y.
- Herbert H. Frost, Inc., Chicago, Ill.
- Garod Corporation, Belleville, N. J.
- Globe Phone Mfg. Company, Reading, Pa.
- Golden-Leutz, Inc., Long Island City, N. Y.
- The Graynie Corporation, Chicago, Ill.
- A. H. Grebe & Company, Inc., Richmond Hill, L. I.
- Grigsby-Grunow-Hinds Company, Chicago, Ill.
- The Halldorson Company, Chicago, Ill.
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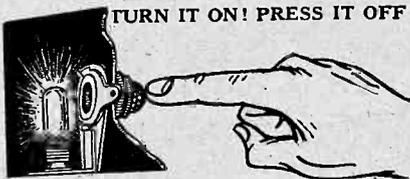
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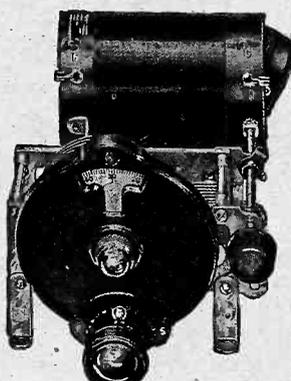
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MACHINE SHOP FOR SALE OR RENT; fully equipped for light manufacturing, metal stamping and bench work; excellent opportunity for organization or individual; immediate action desired. Box 16, 1,329 3d Av., New York City.

Sale of Receivers Grows in Britain

England is turning to the commercial receiver, declared Alfred Wragge, manager of the radio department of Selfridge & Co., Ltd., who left New York for London after two weeks of conference with American radio interests.

"Most of the British interest, at the outset of broadcasting and up to a short time ago," he said, "was in home-built radio equipment. There always will be a lot of that by the experimenter and the amateur, but most people, knowing little about the technical side of wireless, refrained from purchases of equipment until they were certain that the manufactured receiver met their requirements in efficiency and simplicity. That time has come—and now there is a tremendous market

throughout the British Isles for such receivers."

Mr. Wragge declared interest in broadcasting is world-wide, due to the orders and questions from practically every country that reach British experts. Joseph D. R. Freed, of Freed-Eisemann, told him of the rapidly increasing export business of American radio manufacturers and that American receivers were used in the jungles of Africa, on Brazilian rivers, in Japanese villages and in the Arctic zone.

Mr. Wragge was accompanied to the United States by C. Hart Collins of Hart Collins, Ltd., radio instrument makers, also of London, who is a radio engineer and was vitally concerned in the new sets that will go on the market this Fall.

Banquet Program "Greatest Ever"

More than fifty prominent radio executives attended a meeting of the committee for the Third Annual Radio Industries Banquet at the Hotel Astor, where plans for the coming annual banquet were discussed and approved by the committee.

Speaking for the program committee, Major J. Andrew White, master of ceremonies for the annual banquet, made a most enthusiastic report of the activities of the program sub-committee.

"The program presented at the Third Annual Banquet will be the most interesting ever heard at a radio affair," Major White said. "Also, the radio listeners who tune in on the stations broadcasting the banquet will be treated to a feast of entertainment that will be undoubtedly the greatest program ever broadcast in the history of radio."

G. F. McClelland, speaking for the broadcasting committee, reported a long list of broadcasting stations expected to transmit the program from the banquet. In addition to local stations, members of the WEAf chain will broadcast the program, while stations WBZ in Springfield and WGY in Schenectady will also carry the program.

Practically every broadcaster with offices in New York City will participate in the broadcasting. Every effort is being made by the committee to increase the number of stations carrying this program, Mr. McClelland explained, the committee being anxious for as many listeners as possible to enjoy the broadcast.

More than 2,000 radio men are expected to attend the banquet, which will be held at the Hotel Astor on Wednesday, September 15.

Myers Introduces Idea of Tube Kit

The Myers Radio Tube Corporation, of Cleveland, is prepared to furnish special tube kits for all prominent circuits and makes of receivers. Each kit is especially adapted to the particular circuit in which it is to be used and the tubes are marked to denote the positions they are to occupy in the set such as detector, radio frequency, etc.

Myers tubes for universal use in all circuits, made and marked for the functions they are to perform, are available, as usual.

Get Your Share of DX!

DX Means the Reception of Programs from Distant Stations, and that in Turn Means Pure Joy for Many Thousands of Fans. Better Distant Reception is Being Accomplished Right Now Than Was Possible Last Winter!

**THE TRICK LIES IN
KNOWING WHAT
TO DO TO GET DX!**

**ALL THE INSIDE
FACTS AT YOUR
COMMAND FOR 50c!**

CAN YOU ANSWER THESE TEN QUESTIONS?

- (1) How does the tuning in of DX stations differ from the tuning in of locals? (2) How can you make your antenna pick up more energy without adding any wire to it or making any change in your set? (3) If low wavelength stations are too loud and high wavelength stations not loud enough, how can you make them all as loud as desired? (4) What is the easiest way to improve selectivity? (5) How can you reduce the antenna resistance to get highest voltage? (6) How should coils be placed to avoid losses? (7) What effect has audio amplification on ability to get DX? (8) Where should by-pass condensers be placed to improve DX? (9) How should tubes be connected and operated for maximum efficiency? (10) Does the grid leak setting affect DX, and if so, how?

These and many other questions affecting DX are answered in articles by Capt. Peter V. O'Rourke, J. E. Anderson and John F. Rider, published in the April 3, 10 and 24 and May 29 issues of RADIO WORLD. All four copies sent on receipt of 50c., or given free with a year's subscription (52 numbers, \$6.00).

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Economy and performance unheard of before. Recharged at a negligible cost. Delivers unflinching power that is clear, pure and quiet. Approved and listed as Standard by leading Radio Authorities, including Pop. Radio Laboratories, Pop. Sci. Inst. Standards, Radio News Lab., Lefax, Inc., and other important institutions. Equipped with Solid Rubber Case, an insurance against acid and leakage. Extra heavy glass jars. Heavy rugged plates. Order yours today!

SEND NO MONEY Just state number of batteries wanted and we will ship day order is received. Extra offer: 4 batteries in series (96 volts), \$10.50. Pay expressman after examining batteries. 6 per cent discount for cash with order. Mail your order now!

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Makers of the Famous World Radio "A" Storage Battery
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Winter or Summer the Fenway is a consistent DX-getter. Naturally, you want to own one of these super-sensitive receivers. Fenway Blueprints show you how to build a laboratory set.

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HOW TO USE AERIALS IN GROUND AND WATER, by Lewis Winner, appeared in RADIO WORLD, dated May 29. Sent on receipt of 15c, or start subscription with that number. RADIO WORLD, 145 W. 45th St., N. Y. C.

Bruno Sub-Licensed To Use Regeneration

Arrangements have just been concluded between the Bruno Radio Corp., well-known parts firm, and the Clapp-Eastham Co., one of the oldest radio organizations in the business, both of Long Island City, whereby the Clapp-Eastham Co. will manufacture for the Bruno Corp. kits of parts for regenerative receivers employing Bruno products.

By virtue of an agreement between the Clapp-Eastham Co. and the Westinghouse Electric & Manufacturing Company, owners of the Armstrong patent on regeneration, granting Clapp-Eastham exclusive merchandising privileges to regenerative

kits as distinguished from complete regenerative receivers, the new deal between Clapp-Eastham and Bruno authorizes the Bruno Corp. to sell such kits.

William A. Bruno and Robert Hertzberg of the Bruno company have designed a 5-tube receiver comprising one stage of tuned RF, regenerative detector, and three stages of resistance-coupled AF, for which Clapp-Eastham will manufacture a kit of parts intended for the home constructor. The set uses drum-control that mounts on the panel with only two screws. There are less than a dozen wires to install in the set.

Grimes Enters Kit Business

David Grimes, nationally known radio engineer and inventor, has just completed the reorganization of his original company, the Grimes Radio Engineering Company. Grimes has been made President by action of the Board of Directors.

This company has conducted research work under Mr. Grimes' supervision for about five years and, as the sole owner, has exclusive rights under his many inventions and patents.

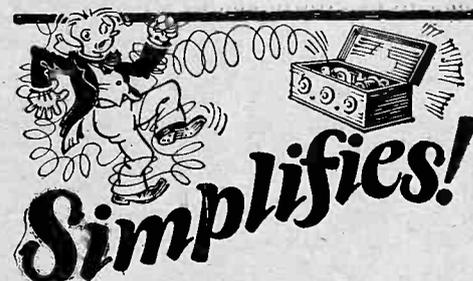
The original work of the company was confined solely to development work and licensing radio manufactures. Now Mr. Grimes' policy will be the releasing of complete up-to-date information on his Inverse Duplex System and the furnishing of complete guaranteed kit sets embodying the invention.

The feature of the Kit is the incorpora-

tion of all the latest engineering products such as, 100% shielding, combination audio coupling, good quality and selectivity. The kit will be put out in two models employing 4 and 5 tubes, for dry cell and storage battery operation.

It will be remembered that David Grimes publicly announced his resignation as chief engineer of David Grimes, Inc., early last spring. This enables him to devote his entire energies to his original company.

Your Radio Set
DESERVES
Good Condensers
The Trade-Mark
TOBE
Insures What It Deserves.
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Radio Is Hailed As Greater Than Movies

The Actor's Point of View Toward the Art Presented To Equity Association—Artists Should Be Paid, Says Chairman

By Katherine Emmet

Radio Committee Chairman, The Actors' Equity Association.

With the newspapers on one hand reporting the building in London of a special Radio Theatre; with the list of applicants to the United States Government for wavelengths including the name of J. J. Shubert; with the Superintendent of Schools advocating school forums and community receiving stations where people in small communities may gather to hear the radio educational and entertainment programs, the handwriting upon the wall is clear.

No matter what our personal prejudices may be, and we always have them against the innovation, the radio is here even in its lusty infancy as a great and vital force, and I venture to prognosticate there is no limit to its growth and its ultimate power.

We of the large cities with entertainment of any sort to be had almost for the asking are prone to forget that 75 per cent. of our population is in the far-off hinterland hungry for good music and good drama. The radio is here to answer that demand in a way more far-reaching than the motion pictures, especially along the lines of literature and music.

Radio Like Movies

With the advent of the motion picture a great hue and cry was raised immediately by us of the stage because we felt it was killing the art of the theatre on the one hand, and on the other, that it was depriving us of our bread and butter. While it has been a serious menace to the theatre beyond all doubt, it has returned something of what it has taken away by giving employment to literally thousands of people who might otherwise be idle. Now comes the radio with the same menace and the same compensation. The radio can, and undoubtedly will, return to the actor what it seems to take away.

There is no use of our standing in the way of a definite public demand. We must take an open-minded view of the situation and find out how we may fit ourselves into the general scheme of the new development.

But we should commence now in the beginning stages to help organize radio actors into the Equity organization, by applying the same principles which govern us as members of this organization to our relations with broadcasting stations and their program managers.

Worthy of His Hire

The laborer is as worthy of his hire in radio as he is on the stage, no more, no less. And while the single actor may imagine that the advertising returns compensate him for loss of salary he is, in the

long run, doing an irreparable wrong to himself, his brother actors and his association by undercutting to the point of offering to do for nothing work that should legitimately be paid for.

This Association has already banned the tendency of the Broadway managers to secure radio performances of their plays without paying the actors for that performance. It is up to us now to see to it that the radio managers be compelled to pay the actors who are broadcasting plays for them direct.

For sixteen months we have been educating the broadcasting stations to pay for their programs. As a matter of fact I find them quite willing to do so, since we have convinced them that they get better work and higher grade talent when they do pay for it.

Will Ask For Better

We have also convinced them that as the years go on their audience will demand better programs, necessitating better actors, and, as a consequence, a gradual increase of the wage scale until it arrives at a living basis. If in that process of education offers come from actors to work for nothing the goose that lays the golden egg is killed early in her career, and the working profession ultimately impoverished.

They are in a humor now to pay reasonably, they are even in a humor to think in terms of higher salaries as the call for good programs increases; and some of them are already visualizing the

(Concluded on page 29)

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THE CONTROL OF FEEDBACK, by Barney Feete, appeared in RADIO WORLD dated April 24. Sent on receipt of 15c, or start sub. with that issue. RADIO WORLD, 145 W. 45th St., N. Y. C.

TABLE FOR CONVERSION OF FREQUENCIES AND METERS appeared in RADIO WORLD dated May 1, 1925. Sent on receipt of 15c, or start your sub. with that number. RADIO WORLD, 145 W. 45th St., N. Y. C.

GETTING DX by Capt. P. V. O'Rourke, appeared in RADIO WORLD dated April 3. 15c per copy or start sub. with that issue. RADIO WORLD, 145 West 45th St., N. Y. C.

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Subscribers will note that the end of their subscriptions is indicated on the labels on wrappers. If your wrapper shows a date earlier than the current issue, please send payment for renewal. Changes in expiration dates on wrappers appear two weeks after receipt of renewal.

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Tell your newsdealer to save a copy of RADIO WORLD for you each week. In this way, you will have a complete file—as sometimes it is difficult to get back numbers.

Or send us \$1.00 and we will save you a copy of each week's issue until September 15, 1926, and mail them to you at whatever date you specify.

Circulation Manager, RADIO WORLD, 145 West 45th Street, N. Y. City

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should be sent to Subscription Department at least two weeks in advance of publication in order to insure early and proper attention. RADIO WORLD'S subscription list is so large that it is necessary that changes be sent in as requested. Address, Subscription Department, RADIO WORLD, 145 W. 45th St., New York.

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145 WEST 45th ST. NEW YORK CITY

An Ether Theatre Is Expected Soon

Stations Reported Visualizing Radio Playhouse, With Performances in Makeup and Costume Before Audiences, With "Mike" Handy

(Concluded from page 28)

day not far off when they too will have a regular Radio Theatre where performances will be given in makeup and costume before audiences and before unseen microphones which carry the entertainment to the farthest ends of the earth.

There is positively no limit to the extent of its work and in its fulfillment no limit to the possibilities for employment for the actor who may be unable to find work he can do, or, I may say, is willing to do in the customary legitimate productions.

Wants No Free Work

While our association has never dictated salary except in the case of the minimum wage for the chorus girl it is obligatory that this Association discourage the offer of free service in an industry that rightly and justly developed will mean the livelihood of thousands. We have no desire to set a wage on the service, but we do feel that some price should be paid.

There is another menace which bears watching. The agent who first approached me on the subject of broadcasting was expecting to collect 50 per cent. of the

amount offered by the broadcasting station for himself. It was only by a coincidence that I and my companions discovered him thus overreaching his mark, and dispensed with his service altogether so that we, the actors, received the full amount offered by the station.

I have learned that recently certain men have written in to the stations offering to produce dramatic programs for a ridiculously low figure, figures that the program managers are compelled to consider—being business men—but the figures are low because the list of fairly well known actors, which he submits with his plan is willing to work for nothing, he says.

Fear of Future

If they can get you for nothing now, when their new Radio Theatre is built you'll have difficulty on persuading them you should be paid, and J. J. Shubert, when his plans are completed, will see no reason why he can't carry on with the slogan "Think of the advertising you are getting!"

Now is the time to establish in the Radio what we have worked years to establish on the stage. When the actor works he must be paid no matter when or where. Be the amount as little or as much as the contracting parties agree upon he must be paid something. Don't let us undermine the whole scheme by offering to work for nothing now while the vast industry is practically in its formative period.

This Association has been accused of changing front in regard to its attitude toward the radio. Its stand is now and always will be against the managers forcing actors to give their services for nothing for extra radio performances which they think will advertise the play; in other words, asking the actor to meet their advertising bills.

Not Against Radio

The Association is not against radio, nor radio entertainment; it foresees to what point it is developing. The earnest desire is to see it become organized for the greatest good of the greatest number.

If you have something to offer for broadcasting uphold your profession by charging for it. Treat it exactly as you would any management from whom you seek employment and so help to establish on a firm business basis this new outlet for our talents which may in the long run be of real and lasting value to the actor in his efforts to earn his bread and butter.

Bring in Europe on a

Victoreen "Super"

Write for Layout and Parts List

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THE 5-TUBE SUPER HETERODYNE SET, by Jasper Jellicoe, appeared in RADIO WORLD dated April 17. Sent on receipt of 15c. RADIO WORLD, 145 W. 45th St., N. Y. C.

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Now you can get more volume with greater clarity.
A.F. 20 for 1st and 2nd Stage.....\$3.00
A.F. 6 Power Tube for 3rd Stage.....\$4.50

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Herman Bernard, designer of this wonder circuit, has written an illustrated booklet on "How to Build RADIO WORLD'S 1926 Model Diamond of the Air." Send 50c and get this booklet, including a full-sized wiring blueprint and free nameplate.

Outstanding Features of Set: (1) Fans, charmed by tone quality, sensitivity and selectivity, report speaker reception of far-distant stations with great volume. (2) A 2-tube earphone set, a 5-tube speaker set, and a separate 3-stage audio-amplifier for immediate use with any tuner, are combined in one. (3) No rheostats are used. (4) The set is inexpensive to construct and maintain. (5) The set works from outdoor aerial or loop, hence no aerial problems present themselves, in city or country.

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[Newsdealers or radio dealers, order the booklets with blueprints included, in quantity, direct from American News Co. or Branches.]

Radio World, 145 West 45th St., New York City
Nameplates Free to All

THEY ALL PRAISE THE **BRETWOOD** Variable Grid Leak

The Bretwood Grid Leak came with today's mail. It is now exactly 9:00 P.M. and the leak was installed about a half hour ago. This note is not only an expression of appreciation but also an attestation of the truth of your advertising. During the past half hour I have tuned in stations "ALL OVER THE DIALS" at leisure, and can adjust reception with the leak almost equal to a variable condenser.

I feel constrained to add that while waiting for reply and then receipt of leak from you, there has been on the set a fixed leak and condenser of well known and thoroughly reliable make, and fairly good reception has been enjoyed, but during this half-hour-only test thus far the results are inexpressibly beyond expectation.

Have been a radio fan only about four years, but feel I have sufficient knowledge and experience to recognize a good thing upon fair trial. Your promptness and desire to satisfy your trade, in this case has won for you another "BRETWOOD BOOSTER." Thank you.
The Rev. WALTER G. BARLOW,
Bishopville, Md.

Very many thanks for your kind letter of the 21st ult. and for the grid leak, which works perfectly. I have tried four different makes of grid leaks. The Bretwood "has 'em beat."

M. SAWYER,
Box 238, Los Gatos, Calif.

Received your grid leak and wish to say that none can compare with it when it comes to clearing up reception.

JOHN A. BLACKBURN,
5328 Warren Ave., Norwood, Ohio.

Enclosed find P. O. money-order for \$3.00. Please send me two of your Variable Grid Leaks. I am using one and it works fine. Please mail them as soon as possible.

W. H. PERRY,
119 Congress St., Buffalo, N. Y.

Received your grid leak and many thanks. It is the best \$1.50 that I have spent for radio equipment.

ED. JENKINS,
703 E. Main St., Louisville, Ky.

Enclosed herewith find check for \$1.50 for one Bretwood Grid Leak. I am using your leak and find it far superior to any others. This is my third Bretwood.

J. C. WHITE,
422 W. Wooster St., Bowling Green, Ohio.

Will you please send me by return mail two Bretwood Variable Grid Leaks. I enclose herewith check for \$3.25, the 25c. being for a special handling stamp, as these leaks are needed at once. The leaks are the only satisfactory instrument on the market. I find them absolutely essential in the construction and operation of sensitive experimental receivers.

ED. J. WHITTIER,
The American Appraisal Co.,
Milwaukee, Wis.

I want to thank you for your leak, it makes the set 100% better. I was going to have a Diamond of the Air built, but since I have added your leak to my set I am now down in the dining room of the first floor and the set is on the second floor. I can hear the set just as plainly as if I were up there. I can hear every player in any band or music which is on air. The first night I gave the leak a very good test, and I got four stations in Chicago, one in Detroit, one in Canada, one in Atlanta, Ga., and several others without any noise. All were good and clear. It is going to make me spend more money, as I will have to get a good loud speaker. The horn I have now is a Manhattan Jr., and is good and clear, but as soon as your leak is installed the howling present when using three tubes is immediately stopped.

LEON E. COLE,
5816 Tilbert St., Philadelphia, Pa.

Grid Leak received and tested out, and find it is the only variable leak I ever used that is really variable. Enclosed find \$1.50, for which please send me another one.

F. E. STAYTON,
Box 240, Ardmore, Okla.

Thank you for introducing me to the Bretwood Variable Grid Leak! I have installed one in my Three-Circuit Tuner, according to your instructions, and find that it does all you said it would—and more. I am now recommending the Bretwood to all my friends, and those who have used this wonder grid leak have nothing but high praise for it. The fact that it can be adapted for any hookup makes it invaluable to the experimenter.

Although I have only used the Bretwood leak for three weeks I have pulled in several of the weaker stations which were inaudible before, and the microphonic noises which were decidedly pronounced before have entirely disappeared. Please accept my best wishes for your continued success and also for the Bretwood Grid Leak.

S. R. HUBBS,
180 Quincy St., Brooklyn, N. Y.

Let me say that the Bretwood Grid Leak improves the set 100%.

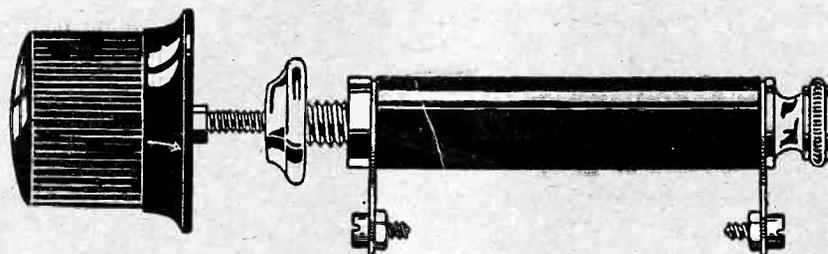
J. E. MCGINNISS,
27 Lenox Rd., Brooklyn, N. Y.

I wish to take this occasion to thank you for your courtesy in furnishing me with your very excellent Grid Leaks. I have installed one with your Condenser on my own personal radio set, and am delighted with the results.

R. W. DeMOTT,
Experimenter Pub. Co.,
53 Park Place, N. Y. C.

I have received the Grid Leak you sent me and it is perfect. It is surely wonderful the way it works. Please send me another by return mail for a friend.

J. F. COOPER,
1029 Courtlandt St.,
Cincinnati, Ohio.



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“My wife insists on getting a radio set exactly like yours. Where did you get it?”

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“How about batteries? I’ve heard you have to give them a lot of attention.”

“Not if you get good ones, Jim. The service man from The Radio Shop who installed my set said that the Evereadys he was supplying were exactly the right size for the receiver and should last eight months or longer. I’ve had the set six months now, and as far as I can tell, the ‘B’ batteries are as good as new.”

That’s the experience of those who follow these simple rules in choosing the right “B” batteries for their receivers:

On all but single tube sets—connect a “C” battery. The length of service given here is based on its use.*

On 1 to 3 tubes—Use Eveready No. 772. Listening in on the average of 2 hours daily, it will last a year or more.

On 4 or more tubes—Use the Heavy-Duty “B” Batteries, either No. 770 or the even longer-lived Eveready Layerbilt No. 486. Used on the average of 2 hours daily, these will last 8 months or longer.

Follow these rules and you, too, will find that Eveready

Radio Batteries offer a most economical, reliable and satisfactory source of radio power. How long they last, of course, depends on usage; so if you listen less you can count on their lasting longer, and if you listen more, they will not last quite so long.

Send for booklet, “Choosing and Using the Right Radio Batteries,” sent free on request. There is an Eveready dealer nearby.

*NOTE: A “C” battery greatly increases the life of your “B” batteries and gives a quality of reception unobtainable without it. Radio sets may easily be changed by any competent radio service man to permit the use of a “C” battery.

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